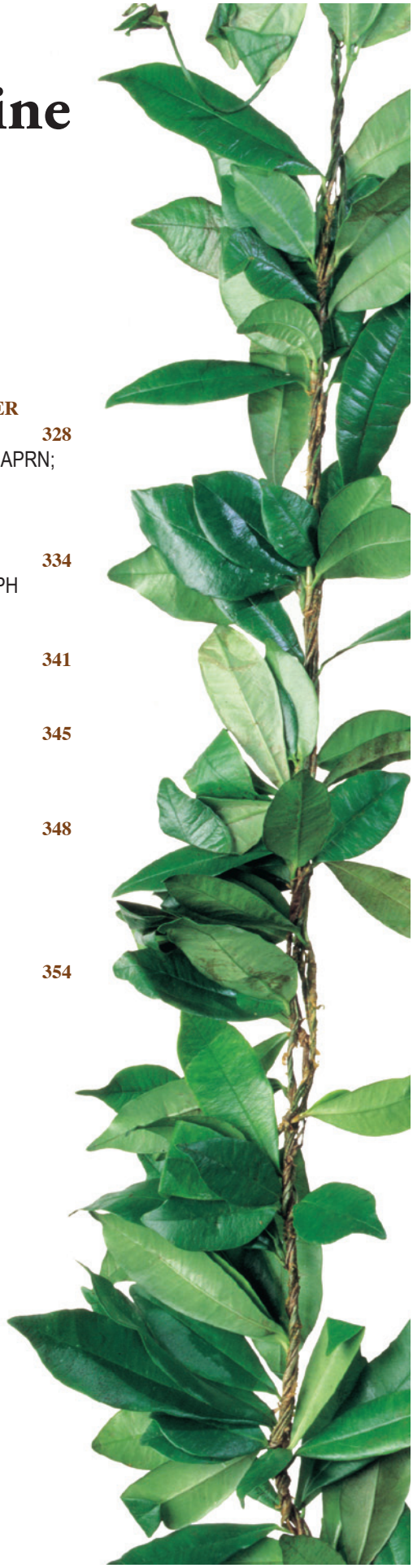
Hawai‘i Journal of Medicine & Public Health

A Journal of Asia Pacific Medicine & Public Health

October 2015, Volume 74, No. 10, ISSN 2165-8218



PROMOTE WELL-BEING

The **Gallup-Healthways Well-Being 5™ survey** provides patients with an in-depth view of their current well-being. They receive personalized information, a Well-Being Score, and a Well-Being Plan that helps them set goals for areas that need improvement.

Research shows that individuals with higher well-being scores perform better and have:

- Fewer hospital admissions.
- Fewer emergency room visits.
- Lower unexpected health care costs.

Encourage your patients to take the Well-Being 5.

LEARN MORE AT HMSA.COM/WBC.

HMSA Well-Being Connect

hmsa

An Independent Licensee of the Blue Cross and Blue Shield Association

Hawai‘i Journal of Medicine & Public Health

A Journal of Asia Pacific Medicine & Public Health

ISSN 2165-8218 (Print), ISSN 2165-8242 (Online)

The Journal's aim is to provide new scientific information in a scholarly manner, with a focus on the unique, multicultural, and environmental aspects of the Hawaiian Islands and Pacific Rim region.

Published by University Clinical, Education & Research Associates (UCERA)

Hawai‘i Journal of Medicine & Public Health
677 Ala Moana Blvd., Suite 1016B
Honolulu, Hawai‘i 96813
http://www.hjmph.org; Email: info@hjmph.org

The Hawai‘i Journal of Medicine & Public Health was formerly two separate journals: The Hawai‘i Medical Journal and the Hawai‘i Journal of Public Health. The Hawai‘i Medical Journal was founded in 1941 by the Hawai‘i Medical Association (HMA), which was incorporated in 1856 under the Hawaiian monarchy. In 2009 the journal was transferred by HMA to University Clinical, Education & Research Associates (UCERA). The Hawai‘i Journal of Public Health was a collaborative effort between the Hawai‘i State Department of Health and the Office of Public Health Studies at the John A. Burns School of Medicine established in 2008.

Hina (D. Varez)

Predictors of Dental Cleaning Over a Two-year Time Period Around Pregnancy Among Asian and Native Hawaiian or Other Pacific Islander Race Subgroups in Hawai'i, 2009-2011

Donald K. Hayes MD, MPH; Matthew Turnure MPH; Deborah J. Mattheus PhD, CPNP, APRN; and Maureen T. Shannon CNM, FNP, PhD, FACNM, FAAN

Abstract

Oral health disease is linked to several chronic diseases including adverse health outcomes around pregnancy. Optimizing a woman's oral health before, during, and after pregnancy can impact her health and the health of her children. Preventive, diagnostic, and restorative dental services can be done safely and effectively including during pregnancy. We examined data from the 2009-2011 Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS) to assess the prevalence of dental cleanings over an approximately 2 year (Median: 2.0 years, Range:1.6-2.5 years) time period (12 months before pregnancy, during pregnancy, and in the first few months postpartum) among 4,735 mothers who recently had a live birth. Adjusted prevalence ratios (APR) of dental cleanings were calculated for both race and Medicaid/QUEST insurance status adjusting for maternal age and education. During a two-year span before, during, and after pregnancy an estimated 60.8% of women had dental cleanings. Native Hawaiian (APR=0.87;95%CI=0.80-0.93), Other Pacific Islander (0.70;0.58-0.83), Filipino (0.90;0.82-0.97), and Chinese (0.76;0.63-0.93) mothers were less likely to have had dental cleanings compared to white mothers. Additionally, mothers with Medicaid/QUEST health insurance (0.73;0.68-0.79) were less likely to have had cleanings. More than one-third of recently pregnant mothers did not have dental cleanings in the approximately two-year time period. Native Hawaiian, Other Pacific Islander, Filipino, and Chinese mothers and those on Medicaid/QUEST health insurance were less likely to receive regular dental care. Identification of the reasons why these populations do not seek regular dental care can inform programmatic efforts to improve oral health outcomes for women and families.

Introduction

The public health implications of poor oral health are vast and may impact a person's ability to eat, speak, work, communicate, and learn.[1] Although many oral diseases and conditions are preventable, virtually all adults, and many children, have experienced some degree of oral disease.[1] In the United States (US), the two most common oral diseases are dental caries (tooth decay) and periodontal (gum) disease, with dental caries being the most common chronic disease in children with approximately 37% of children aged 2-8 years having experienced dental caries in their primary teeth in 2011-2012.[2] Periodontal disease also affects nearly half of adults (47%) 30 years of age and older, increasing from 24.4% in 30 to 34 year olds to 70.1% who are 65 years and older.[3]

During pregnancy and the reproductive years, women have frequent contacts with the healthcare system yet studies consistently show low utilization of dental services during pregnancy.[4-8] Prenatal visits provide an unique opportunity to encourage pregnant women to seek preventive dental care during pregnancy, and is an important time to provide health education and counseling that can result in both improved birth outcomes and long-term general health.[9,10] Physiological changes during pregnancy may result in noticeable changes in oral health including pregnancy gingivitis, benign oral gingival lesions, tooth mobility, tooth erosions, dental caries, and periodontitis. Improved oral health may also decrease transmission of potentially cariogenic bacteria to infants and reduce children's future risk of caries.[10]

Optimizing a woman's oral health before, during, and after pregnancy can impact her health and the health of her children. The American Congress of Obstetricians and Gynecologists issued a committee opinion in 2013 about oral health care during pregnancy and throughout the life span. According to the committee opinion, oral health care during pregnancy can be done safely and effectively at all stages of pregnancy.[11] The American Dental Association (ADA) recommends seeing a dentist regularly for professional cleanings and oral exams at least once a year, with greater frequency in higher risk patients. Furthermore, the ADA supports oral examinations and dental cleanings during pregnancy.[12,13]

The population in Hawai'i is racially diverse and includes several Asian and Native Hawaiian or Other Pacific Islander (NHOPI) racial groups not often reported in the general literature. According to the US Census Bureau in 2010 in Hawai'i, 38.6% of the state population self-identify as Asian alone(525,078) and 57.4% self-identify as either Asian alone or mixed Asian.[14] Ten percent report being in the NHOPI group alone (135,422) and 26.2% report being in the NHOPI alone or in combination (355,816).[14] This compares to national estimates of 4.8% reporting Asian alone (5.6% Asian alone or in combination), and 0.2% in the NHOPI alone group (0.4% NHOPI alone or in combination).[14] Whites account for 24.7% (336,599) of the state population (41.5% White alone or in combination), compared to72.4% White alone (74.8% White alone or in combination) nationally. In addition to the large proportion who are of multiple race groups, Asians and NHOPI have several distinct subgroups with different cultures, languages, and periods of residence in the US.[15,16]

Dental utilization practices among subgroups of Asian and NHOPI populations are not well characterized in the literature. Due to the range of health benefits conferred through dental cleanings, determining population level estimates within individual Asian and NHOPI subgroups may identify disparate groups that could benefit from health promotion efforts specifically targeted to address their unique needs. This study

examines receipt of routine teeth cleaning among new mothers in Hawai'i particularly among the Asian and NHOPI population subgroups in the State of Hawai'i. We examine the importance of race and health insurance status as well as other factors on teeth cleaning rates. These results may assist in the identification of populations who might benefit from outreach and focused interventions.

Materials and Methods

The 2009-2011 Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS) survey data were combined into a single multi-year data set for this analysis. The PRAMS is an ongoing state and population-based surveillance system that monitors selected maternal behaviors and experiences among mothers before, during, and after a pregnancy that resulted in a live birth. The PRAMS survey is based on a self-reported questionnaire mailed to selected participants using the birth certificate as a sampling frame, with follow-up mailings and a phone survey for non-responders. A total of 6,641 mothers were sent surveys, with an overall response rate of 71% (N = 4,735). Additional information about the PRAMS survey, including specific details on methodology, is available online at http://www.cdc.gov/PRAMS.

To determine routine teeth cleaning, we evaluated two questions: (1) "At any time during the 12 months before you got pregnant with your new baby…had my teeth cleaned by a dentist or dental hygienist?"; and (2) "Did you have your teeth cleaned by a dentist or dental hygienist during the time periods listed below….a. During my most recent pregnancy…b. After my most recent pregnancy". Response choices were either no or yes. We reviewed each question individually, but for the purposes of this paper we focused on a composite variable where a dental cleaning was considered a "yes" response to having a dental cleaning in any of the three time periods. To determine the overall time period for the composite variable used in this analysis, we added 12 months before pregnancy, the weeks of pregnancy based on gestational age of infant at birth, and the age of the infant when the survey was completed and will be referred to as teeth cleaning in a 2 year time period.

The Hawai'i birth certificate collects maternal and paternal ethnic/racial information after a birth has occurred and includes all racial/ethnic groups. The parents identify the racial/ethnic group that is entered on the form. This information is converted to one of 22 single racial groups by an algorithm implemented by the Office of Health Status Monitoring in the Hawai'i Department of Health.[17] The priority of this algorithm for individuals who list multiple races is Hawaiian, followed by the first non-Caucasian race reported. Thus, individuals who report being Hawaiian in combination with another race would be considered part-Hawaiian. For our analysis to be consistent with race reporting in Hawai'i, those identifying as part-Hawaiian were combined with the Hawaiian single race group and considered to be Native Hawaiian. A total of the 22 single coded maternal race variables (including part-Hawaiian) were categorized into 7 groups to ensure sufficient sample size for reliable estimates: White, Native Hawaiian, Other Pacific Islander, Filipino, Japanese, Chinese, and Other/Unknown.

Medicaid/QUEST health insurance status was determined by the reporting of Medicaid/QUEST health insurance in at least one of the three time periods: month before pregnancy, during pregnancy, and at delivery. Participants were excluded if they had no information on insurance in any of the time periods, if they reported self-pay in all 3 time periods, or if they reported self-pay in at least one period with nothing reported for the other time periods. Additional exclusions were applied if participants had missing information for other covariates. There was no information on dental coverage available in the PRAMS data so health insurance was used as a potential proxy for access to dental services.

Maternal age, calculated by mother's age upon birth of the infant, was categorized into age groups of <20, 20-24, 25-29, 30-34, and 35 or more years. Maternal education was categorized as "< High School" for mothers with <12 years of education, "High School or Equivalent" for mothers completing 12 years of formal education, "Some College" for mothers with 13-15 years of education, and "College Graduate" for mothers with 16 or more years of education.

Annual prevalence estimates and 95% confidence intervals (CIs) were calculated for receipt of a teeth cleaning in 2 years. Predicted marginals were used to estimate prevalence ratios for teeth cleaning in 2 years.[18] Maternal race and Medicaid/QUEST health insurance status were the primary variables of interest. Covariates were selected based on a review of the general literature and availability in the PRAMS data. A model building strategy that assessed for relative significance of the individual risk factors (using a change of less than 10% in the log likelihood ratio as the criterion) was used to develop the final model. The final model included the individual covariates of maternal age, maternal education, and primary predictors of race and Medicaid/QUEST health insurance status. No interaction was found between race and Medicaid/QUEST health insurance. Other variables not included in the final model included marital status and pre-pregnancy weight status. Data were weighted to reflect the state's population of mothers with a recent live birth. SAS version 9.2 (SAS Institute, Inc, Cary, North Carolina) and SAS-callable SUDAAN version 10.0 (Research Triangle Institute, North Carolina) were used to account for the complex sampling design to provide population estimates and calculate accurate variance estimates with a significance level of $P < .05$. The PRAMS protocol was reviewed and approved by the Institutional Review Boards at the Centers for Disease Control and Prevention and the Hawai'i State Department of Health.

Results

A total of 6,641 mothers were sent surveys, with an overall response rate of 71% (N = 4,735). From the initial 4,735 respondents, we excluded 53 records where teeth cleaning status could not be determined and 32 due to problems with the composite insurance variable. Fourteen of these 32 had no information

on insurance in any of the time periods and18 reported self-pay in all 3 time periods or in at least one period with nothing reported for the other time periods. In the final model, 80 more observations were excluded due to missing information on other covariates for a final sample of 4,570 for this analysis

Of the 4,570 participants, 51.9% reported a teeth cleaning in the 12 months before pregnancy, 34.8% reported a cleaning during pregnancy, and 27.3% reported a cleaning after pregnancy (Table 1). Overall, 60.8% of mothers had a teeth cleaning within 2 years around pregnancy, which corresponded to a median time period of 2 years (Mean 2.1 years, Range 1.6-2.5 years). The two largest groups represented in the sample were Native Hawaiian (30.1%) and White (23.0%) mothers. The three major Asian subgroups (Filipino, Japanese, and Chinese) in the State of Hawai'i made up just under a third of the population. Dental cleaning was greatest in the year before pregnancy, with just over half of the mothers having had a cleaning. During pregnancy just over one-third had a cleaning, and just over one-quarter had a cleaning after pregnancy.

Native Hawaiian (53.5%) and "Other Pacific Islander" (34.4%) mothers had the lowest estimate of teeth cleaning within 2 years, while White (72.9%) and Japanese (72.1%) mothers had the highest estimates (Table 2). Mothers 20-24 (49.4%) and 25-29 (57.6%) years of age had the lowest estimates of teeth cleaning within 2 years, while Mothers ages 30-34 (68.0%) and 35 years and over (69.3%) had higher estimates. Mothers with less than a high school education (46.7%) or a high school education or equivalent only (50.8%) also had low estimates of teeth cleaning within 2 years. Mothers on Medicaid/QUEST health insurance (44.3%) had lower estimates of teeth cleaning within 2 years compared to those not on Medicaid/QUEST (71.2%).

After adjusting for maternal age, maternal education, and Medicaid/QUEST health insurance, compared to Whites, the racial differences in prevalence ratios for teeth cleaning persisted for all race groups. The adjusted prevalence ratios were approximately 13% lower among Native Hawaiian, 30% lower in "Other Pacific Islanders," 10% lower among Filipino, and 24% lower among Chinese mothers (Table 3). Similarly, after adjustment for maternal race, maternal age, and maternal education, the difference related to Medicaid/QUEST health insurance status persisted. The adjusted prevalence ratios were 27% lower in those with Medicaid/QUEST health insurance.

Table 1. Characteristics of Study Population, Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2011

	Sample	(%)	95% CI[a]
Maternal Race			
White	1,081	23.0	(21.5 - 24.6)
Native Hawaiian	1,516	30.1	(28.4 - 31.7)
Other Pacific Islander	286	7.4	(6.4 - 8.5)
Filipino	900	17.8	(16.5 - 19.2)
Japanese	410	9.3	(8.3 - 10.5)
Chinese	167	4.1	(3.4 - 5.0)
Other/Unknown	375	8.3	(7.3 - 9.4)
Maternal Education			
<High School	371	7.5	(6.6 - 8.5)
High School or equivalent	1,872	39.7	(37.9 - 41.5)
Some College	1,128	23.5	(22.0 - 25.1)
College Graduate	1,306	29.3	(27.7 - 31.0)
Maternal Age			
Under 20	372	7.3	(6.5 - 8.5)
20-24	1,077	23.6	(22.1 - 25.5)
25-29	1,286	27.3	(50.1 - 54.1)
30-34	1,145	24.4	(15.3 - 18.2)
35 and older	855	17.4	(16.1 - 18.8)
Medicaid/QUEST Health Insurance			
Yes	1,949	38.2	(36.5 – 40.0)
No	2,754	61.8	(60.0 – 63.5)
Teeth cleaning before pregnancy			
Yes	2,404	51.9	(50.0-53.7)
No	2,305	48.1	(46.3-50.0)
Teeth cleaning during pregnancy			
Yes	1,615	34.8	(33.0-36.5)
No	3,030	65.2	(63.5-67.0)
Teeth cleaning after pregnancy			
Yes	1,209	27.3	(25.7-29.0)
No	3,368	72.7	(71.0-74.3)
Teeth cleaning 2 years (composite)			
Yes	2,816	60.8	(59.0-62.6)
No	1,866	39.2	(37.4-41.0)
Total		4,735	100.0

[a]95% CI refers to 95% Confidence Intervals
Note: Sample subtotals may not add due to missing values

Table 2. Teeth Cleaning within 2 years by Characteristics, Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2011

	Teeth Cleaning Estimate (%)	95% CI[a]
Maternal Race		
White	72.9	(69.4 - 76.1)
Native Hawaiian	53.5	(50.2 - 56.7)
Other Pacific Islander	34.4	(27.7 - 41.7)
Filipino	62.1	(57.8 - 66.1)
Japanese	72.1	(66.3 - 77.2)
Chinese	58.9	(49.2 - 67.9)
Other/Unknown	62.9	(56.5 - 69.0)
Maternal Education		
<High School	46.7	(40.0 - 53.6)
High School or equivalent	50.8	(47.8 - 53.7)
Some College	61.4	(57.6 - 65.0)
College Graduate	78.1	(75.1 - 80.8)
Maternal Age		
Under 20	66.1	(59.7 - 72.0)
20-24	49.4	(45.5 - 53.2)
25-29	57.6	(54.1 - 61.0)
30-34	68.0	(64.5 - 71.4)
35 and older	69.3	(65.1 - 73.1)
Medicaid/QUEST Health Insurance		
Yes	44.3	(41.4 – 47.3)
No	71.2	(69.0 – 73.3)
Marital Status		
Married	68.7	(66.5 - 70.8)
Not-married	48.4	(45.4 - 51.3)
Body Mass Index		
Underweight	67.4	(62.4 - 72.0)
Normal	62.5	(60.0 - 64.9)
Overweight	58.3	(53.1 - 63.4)
Obese	53.8	(49.6 - 58.0)
Overall	60.8	(59.0 - 62.6)

[a]95% CI refers to the 95% Confidence Interval

Table 3. Crude and Adjusted Prevalence Ratios for Teeth Cleaning within 2 years, Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS), 2009-2011

	Crude PR	95% CI[a]	Adjusted PR[b]	95% CI
Race				
White	1.00		1.00	
Native Hawaiian	**0.73**	**(0.68 - 0.79)**	**0.87**	**(0.80 - 0.93)**
Other Pacific Islander	**0.47**	**(0.38 - 0.58)**	**0.70**	**(0.58 - 0.83)**
Filipino	**0.85**	**(0.78 - 0.92)**	**0.90**	**(0.82 - 0.97)**
Japanese	0.99	(0.91 - 1.08)	0.93	(0.84 - 1.03)
Chinese	**0.81**	**(0.68 - 0.95)**	**0.76**	**(0.63 - 0.93)**
Other/Unknown	**0.86**	**(0.77 - 0.96)**	**0.91**	(0.81 - 1.01)
Education				
<High School	**0.60**	**(0.51 - 0.70)**	**0.71**	**(0.61 - 0.84)**
High School or equivalent	**0.65**	**(0.61 - 0.70)**	**0.74**	**(0.69 - 0.80)**
Some College	**0.79**	**(0.73 - 0.84)**	**0.85**	**(0.79 - 0.91)**
College Graduate	1.00		1.00	
Age				
Under 20	1.00		1.00	
20-24	**0.75**	**(0.66 - 0.84)**	**0.74**	**(0.68 - 0.81)**
25-29	**0.87**	**(0.78 - 0.97)**	**0.74**	**(0.68 - 0.80)**
30-34	1.03	(0.93 - 1.14)	**0.79**	**(0.72 - 0.86)**
35 and older	1.05	(0.94 - 1.17)	**0.78**	**(0.71 - 0.86)**
Medicaid/QUEST Health Insurance				
Yes	**0.62**	**(0.58 - 0.67)**	**0.73**	**(0.68 - 0.79)**
No	1.00		1.00	

[a]95% CI refers to the 95% Confidence Interval.
[b]PR refers to prevalence ratio. Final model adjusted for all other variables listed.

Discussion

This study focused on women who recently had a live birth in the State of Hawai'i during 2009-2011 to assess the receipt of a dental cleaning during an approximate two-year time period centered on the pregnancy, including the year before pregnancy and the 3-6 months after delivery. Nearly 4 out of 10 women did not have their teeth cleaned over the two-year time period, with nearly all Asian and Native Hawaiian or Other Pacific Islander subgroups having lower utilization of dental cleaning compared to White mothers. For comparison, an estimated 82% of the general population of women of reproductive age, 18-44 years, in Hawai'i had a dental cleaning within the past 2 years and 84% had seen a dentist within the past 2 years.[19] The lower rate demonstrated (60.8%) among women in this study centered around pregnancy emphasizes the importance of identifying barriers to utilization of dental services. Dental cleanings for all vulnerable groups may improve the oral health outcomes and overall health status of these populations.

This study revealed lower estimates in dental cleaning among most race/ethnic population subgroups in the State of Hawai'i. The reasons for these findings are not immediately clear. Further evaluation is needed to understand potential cultural, financial, and geographic explanations. For example, analysis to understand these changes could include evaluation of factors such as the acculturation levels of various race/ethnic subgroups in Hawai'i. The variation in dental services utilization could be related to acculturation similar to those shown for higher rates of breastfeeding among mothers who were immigrants compared to those born in the US.[20] A measure of acculturation such as maternal nativity or time living in the US were not available in the PRAMS analytic file for analysis thereby preventing assessment of this factor. It could also potentially be related to lack of knowledge about the importance of dental cleaning, as well as other known barriers including the cost of dental services, lack of dental care coverage, and accessibility.[9,21-23] Supportive system measures or identified reasons for not receiving a dental cleaning were not available from the PRAMS data to better characterize other factors that may be related to the variation seen among Asian and NHOPI subgroups. Understanding differences among these population subgroups could be used to inform specific interventions to promote utilization of dental services to reduce health disparities and optimize health outcomes.

This study highlights that those on Medicaid/QUEST insurance were less likely to have a dental teeth cleaning than those on non-Medicaid/QUEST (eg, private health insurance). Due to the absence of data on dental health insurance in the PRAMS dataset, medical health insurance was included as a possible proxy in this study for access: Nationally, among those under age 65 years with private health insurance, an estimated 26% in 2008 did not have any forms of dental insurance (eg, 74% had some form of dental insurance).[24] Whereas, Hawai'i's Medicaid/QUEST adult dental coverage only provides emergency care and does not offer comprehensive dental care.[25] Thus, those on Medicaid/QUEST likely do not have the same level of access to dental care services as those on private insurance. Further, the loss of the adult oral health benefit in Medicaid/QUEST in 2010 may have resulted in an increase in use of the emergency room for likely preventable oral health care as seen in a recent report that showed there were 3,021 visits in 2012 compared to 1,808 in 2006 (a 67.1% relative change) for diagnoses related to preventable oral health problems.[26] Re-establishment of comprehensive dental coverage for adult participants in Medicaid/QUEST that includes coverage of dental cleanings and other prevention may help improve access to timely care and result in better health through improved dental utilization among this population.

The limitations of this study include the use of self-reported data based on questions about dental cleaning and other topics that may be subject to social desirability bias. Vulnerable populations without a stable mailing address and/or phone number (eg, homeless, uninsured, migrants, and mentally ill), or those who don't speak/read English are not represented in the PRAMS survey or its results. Another limitation of this study is that race categorization is limited to the single race reported in the Hawai'i birth certificate data. A recent study of births that included all the information on race/ethnicity entered on the birth certificate revealed that in Hawai'i about a third of both mothers and fathers reported more than one of the 5 standard federal race groups (White, Black, Asian, NHOPI, American Indian or Alaskan Native), compared to 1.0-2.7% of births in California, Utah, Pennsylvania, and Washington.[27] Due to the large proportion of mothers who are of multiple race groups in Hawai'i, the ability to generalize these results is limited, particularly among Asian and NHOPI subgroups who may live outside of Hawai'i. This study was based on a diverse population in Hawai'i and, although many of these same populations live in communities across the country, there could be substantial acculturation and cultural variations in those groups living outside of Hawai'i. However, the results from this study can provide some insight into dental service utilization patterns in these subgroups. It will be important to validate them before generalizing, due to potential differences among these groups. There were three different time periods; each with a different length, included in the composite 2-year dental cleaning variable and each successively smaller interval had an overall lower prevalence estimate of dental cleaning. The impact of pregnancy and caring for a newborn may have resulted in the lower utilization of dental cleanings, but it may also be due to the generally shorter time period. Further analyses focusing on differences in these specific time periods may better characterize the impact of pregnancy and newborn care on dental utilization. Similarly, the insurance questions also referred to three slightly different time periods and were included in an aggregate to approximate the general participation in Medicaid/QUEST even though Hawai'i has lower eligibility thresholds for Medicaid/QUEST while pregnant. Both of these composite variables were used to focus on an overall and general time period and not attempting to characterize the specific impact that a pregnancy has on dental cleaning.

More than one-third of recently pregnant mothers did not have a dental cleaning in the approximately 2-year time period covering the 12 months before, during, and after pregnancy. Several population groups in Hawai'i are not accessing regular dental cleanings around pregnancy. Identifying specific population groups who do not receive regular dental care can inform program efforts to promote health. To improve utilization of dental services, dental providers, non-dental healthcare providers, and community groups it may be necessary to increase their awareness of the lower rates of dental services utilization among some subgroups of Asian and NHOPI mothers as well as those on Medicaid/QUEST health insurance in Hawai'i. Information about the reasons these groups do not seek regular dental care and documentation of clinical measures associated with poor oral health in these groups would also be helpful in informing programmatic efforts to improve oral health in the State of Hawai'i. With awareness and understanding of these differences, strategies can be developed to promote oral health across the lifespan.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Hawai'i Department of Health.

Conflict of Interest

None of the author identify any conflict of interest.

Acknowledgments

The authors would like to acknowledge the Hawai'i PRAMS program, funded by the Centers for Disease Control and Prevention grant #1U01DP003145, for making the data available to researchers. This study/report was supported in part by an appointment to the Applied Epidemiology Fellowship Program administered by the Council of State and Territorial Epidemiologists (CSTE) and funded by the Centers for Disease Control and Prevention (CDC) Cooperative Agreement Number 1U38OT000143-02. The authors also appreciate the assistance from Dave Goodman and Charlan Kroelinger in the Division of Reproductive Health at the Centers for Disease Control and Prevention Maternal and Child Health Epidemiology Team who assisted in oversight and general review of the analysis.

Authors' Affiliations:
- Hawai'i Department of Health, Honolulu, HI (DKH, MT)
- CSTE Applied Epidemiology Fellow, Atlanta, GA (MT)
- University of Hawai'i at Manoa School of Nursing and Dental Hygiene, Honolulu, HI (DJT, MTS)

Correspondence to:
Donald K Hayes MD, MPH;
Epidemiologist, Hawai'i Department of Health,
Family Health Services Division; 1250 Punchbowl St, Room 216, Honolulu, HI 96813; Ph: (808) 586-4521;
Email: Don.hayes@doh.hawaii.gov

References

1. Benjamin RM. Oral health: the silent epidemic. *Public Health Rep.* 2010;125(2):158-159.
2. Dye B, Thornton-Evan G, Li X, Iafolla T. *Dental caries and sealant prevalence in children and adolescents in the United States, 2011-2012.* Hyattsville, MD: National Center for Health Statistics;2015.
3. Thornton-Evans G, Eke P, Wei L, et al. Periodontitis among adults aged ≥30 years - United States, 2009-2010. *MMWR Surveill Summ.* 2013;62 Suppl 3:129-135.
4. Al Habashneh R, Guthmiller JM, Levy S, et al. Factors related to utilization of dental services during pregnancy. *J Clin Periodontol.* 2005;32(7):815-821.
5. Curtis M, Silk HJ, Savageau JA. Prenatal oral health education in U.S. dental schools and obstetrics and gynecology residencies. *J Dent Educ.* 2013;77(11):1461-1468.
6. Kurien S, Kattimani VS, Sriram RR, et al. Management of pregnant patient in dentistry. *J Int Oral Health.* 2013;5(1):88-97.
7. Lin DL, Harrison R, Aleksejuniene J. Can a prenatal dental public health program make a difference? *J Can Dent Assoc.* 2011;77:b32.
8. Timothé P, Eke PI, Presson SM, Malvitz DM. Dental care use among pregnant women in the United States reported in 1999 and 2002. *Prev Chronic Dis.* 2005;2(1):A10.
9. Azofeifa A, Yeung LF, Alverson CJ, Beltrán-Aguilar E. Oral health conditions and dental visits among pregnant and nonpregnant women of childbearing age in the United States, National Health and Nutrition Examination Survey, 1999-2004. *Prev Chronic Dis.* 2014;11:E163.
10. Workgroup OHCDPE. Oral Health Care During Pregnancy: A National Consensus Statement. Washington, DC: National Maternal and Child Oral Health Resource Center; 2012.
11. Physicians ACoOaGWsHC, Women CoHCfU. Committee Opinion No. 569: oral health care during pregnancy and through the lifespan. *Obstet Gynecol.* 2013;122(2 Pt 1):417-422.
12. For the dental patient: oral health during pregnancy. *J Am Dent Assoc.* 2011;142(5):574.
13. For the dental patient. Keeping your mouth healthy during pregnancy. *J Am Dent Assoc.* 2013;144(11):1314.
14. 2010 Census. Summary File 1, Table P3 and P6. 2010. http:///www.factfinder2.census.gov. Accessed February 19, 2015.
15. Reeves T, Bennett C. *The Asian and Pacific Islander Population in the United States: March 2002.* . Washington, DC: U.S. Census Bureau;2003.
16. Reeves T, Bennett C. *We the people: Asians in the United States.* Washington, DC: U.S. Census Bureau;2004.
17. Sorenson C, Wood B, Prince E. Race & ethnicity data: Developing a common language for public health surveillance in Hawaii. *Californian Journal of Health Promotion.* 2003(Special Issue: Hawaii):91-104.
18. Bieler GS, Brown GG, Williams RL, Brogan DJ. Estimating model-adjusted risks, risk differences, and risk ratios from complex survey data. *Am J Epidemiol.* 2010;171(5):618-623.
19. Centers for Disease Control and Prevention. Web Enabled Analysis Tool: 2010 BRFSS Data Tabulations. http://www.cdc.gov/brfss/data_tools.htm. Accessed May 1, 2015, 2015.
20. Singh GK, Kogan MD, Dee DL. Nativity/immigrant status, race/ethnicity, and socioeconomic determinants of breastfeeding initiation and duration in the United States, 2003. *Pediatrics.* 2007;119 Suppl 1:S38-46.
21. Dye BA, Li X, Thornton-Evans G, National Center for Health Statistics (U.S.). *Oral health disparities as determined by selected Healthy People 2020 oral health objectives for the United States, 2009-2010.* Hyattsville, MD: U.S. Dept. of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 2012.
22. Hwang SS, Smith VC, McCormick MC, Barfield WD. Racial/ethnic disparities in maternal oral health experiences in 10 states, pregnancy risk assessment monitoring system, 2004-2006. *Matern Child Health J.* 2011;15(6):722-729.
23. Singhal A, Chattopadhyay A, Garcia AI, Adams AB, Cheng D. Disparities in unmet dental need and dental care received by pregnant women in Maryland. *Matern Child Health J.* 2014;18(7):1658-1666.
24. Bloom B, Cohen R. Dental Insurance for Persons Under Age 65 Years with Private Health Insurance: United States, 2008. NCHS data brief, no 40. Hyattsville, MD: National Center for Health Statistics; 2010.
25. Centers for Medicare and Medicaid Services. Dental Care. http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/ Benefits/Dental-Care.html. Accessed February 20, 2015, 2015.
26. Family Health Services Division. Hawaii Oral Health: Key Findings. Hawaii Department of Health. 2015. http://health.hawaii.gov/fhsd/publications. Accessed July 13, 2015.
27. Hamilton BE, Ventura SJ. Characteristics of births to single- and multiple-race women: California, Hawaii, Pennsylvania, Utah, and Washington, 2003. *Natl Vital Stat Rep.* 2007;55(15):1-20.
28. U.S. Department of Health and Human Services. *Healthy People 2020 Objectives.* 2010.

Assessing Face Validity of a Food Behavior Checklist for Limited-resource Filipinos

Jinan C. Banna PhD, RD, CDN; Opal Vanessa Buchthal DrPH; and Socorro Tauyan MPH

Abstract

Diet-related chronic health conditions are prevalent in the Filipino American community; however, there is a lack of rigorously validated nutrition education evaluation tools in Tagalog for use in this population. This study aimed to develop and evaluate the face validity of a Tagalog-language food behavior checklist (FBC). A multi-step method was used, involving translation of questionnaire text from English to Tagalog by a team of professionals, creation of accompanying color photographs, cognitive testing with the target population, final review by the team of professionals, and assessment of readability. Subjects for cognitive testing were men (n=6) and women (n=14) 18 years or older in Hawai'i who received or were eligible to receive Supplemental Nutrition Assistance Program (SNAP) benefits, self-identified as Filipino, and preferred Tagalog rather than English. Participants were recruited from churches, the Filipino Center, and other community sites. Cognitive interviews revealed several issues with text and photographs, such as preferences for specific terms, and images that did not adequately illustrate the text. Image changes were made to reflect items most commonly consumed. The team of professionals agreed with participant suggestions. Assessment of readability revealed a reading level appropriate for a low-literacy population of grade 5.9. The multi-step process, which allowed members of the target audience to reveal the appropriateness of the questionnaire, yielded a Tagalog-language FBC found to have adequate face validity. After further evaluation of validity and reliability, this tool may be used to evaluate behavior change resulting from the United States Department of Agriculture's (USDA) nutrition education programs.

Keywords

survey, validation, Filipino, Tagalog, food behaviors

Introduction

Asian-Americans are the most rapidly growing population of immigrants in the United States, and are a highly diverse group. Within this broad category, Filipino Americans are both the second-largest and the second-fastest-growing Asian subgroup in the United States.[1] Diet-related chronic health conditions are common in this group, with a recent review of rates of overweight and obesity among Asian-American subgroups revealing that Filipinos had the highest reported mean body mass index (BMI) of all Asian populations, at 26.8 kg/m(2).[2] Previous studies have shown that the Filipino-American population exhibits health disparities regarding conditions closely tied to dietary behaviors, including diabetes[3] and hypertension.[4] In Hawai'i, rates of diabetes in the Filipino population (12.0%) are similar to those seen in the Native Hawaiians, and more than double that of the White population.[5] Both adult and adolescent Filipinos in Hawai'i are more likely than the general population to be overweight or obese.[6,7] Given the high rates of diet-related chronic conditions in this population, it is imperative to promote dietary habits that will lead to maintenance of a healthy weight and ultimately prevention of disease.

To meet the needs of low-income populations regarding nutrition education, the United States Department of Agriculture (USDA) administers several programs, such as the Supplemental Nutrition Assistance Program Education (SNAP-Ed) and the Expanded Food and Nutrition Education Program. These programs have demonstrated positive effects on nutrition behaviors of limited-resource populations across the lifespan.[8] Evaluation of these programs is essential in determining effectiveness and providing justification for continued funding.[9,10] In conducting the evaluation, educators must have culturally-appropriate tools tailored to the target population in terms of language, reading level, and vocabulary.[9–11]

A 2011 report from the US Census Bureau revealed that since the year 2000, the number of Tagalog speakers in the United States has increased significantly; moreover, of the total population of Tagalog speakers in the United States, 32.8% speak English less than "very well."[12] In Hawai'i, where Filipinos represent 14.4% of the population, 21% speak English less than "very well."[13] Per capita income among Hawai'i's Filipino population is 69% of the state average, and Filipinos represent almost a quarter (22%) of the state's Food Stamp Participants.[13] To assess the impact of their programs on low-literacy Filipinos, nutrition educators must have evaluation tools in the language of the target population, using vocabulary common to this audience.

A review of the literature, however, reveals the absence of rigorously validated nutrition education evaluation tools in Tagalog for use in the Filipino population in the United States In examining studies reporting on the development of instruments to assess dietary intake in Filipino Americans, only one qualitative study was identified that focused on providing suggestions for modification of a tool designed for the general population.[14] Focus groups were conducted with Filipino Americans to pinpoint problems with the content of the English-language food frequency questionnaire (FFQ) under study, and suggestions were gathered with regards to tailoring the tool. Focus group results indicated that three quarters of the Filipino-American study participants reported that the FFQ did not include food items that were commonly eaten in the Filipino-American culture.[14] The results of this study provide preliminary evidence that dietary assessment tools designed to capture intake of the general population in the United States may not effectively characterize the diets of Filipino Americans.

One method of assessing whether a tool measures what it purports to measure is to assess its face validity. Face validity, as the name suggests, is a measure of determining to what degree a target population finds the tool to be reasonable and understandable at face value.[9,15–17] In outlining a systematic

process for development and validation of evaluation measures for nutrition education programs, Townsend, et al, identifies assessment of face validity as an essential step in the first stage of developing evaluation tools and determining whether a tool is valid.[9] To evaluate face validity, members of the target audience or those familiar with the target audience determine how practical and relevant the questionnaire is for the group.[17] In previous studies seeking to develop tools focused on various aspects of diet and nutrition, face validity has often been assessed through the use of interviews with the target population to determine how appropriate the questionnaire content is for the group, as well as through expert assessment of reasonableness, appropriateness, and attractiveness.[18–22] While assessment of face validity allows for determination of acceptability for a target audience, it is also necessary to assess the correlation with other measures, as well as repeatability, making evaluation of face validity a preliminary step in questionnaire testing.[15]

The objective of the current study was to develop and assess the face validity of a food behavior checklist (FBC) in Tagalog using a multi-step method involving translation, creation of images to accompany the text, and techniques based on cognitive science.

Methods

Development of the English-language FBC that formed a basis for development of the Tagalog-language tool has been previously described.[10,11] This tool assesses diet-related practices such as consumption of sugar-sweetened beverages, fruits and vegetables, and low-fat dairy products, as well as overall diet quality and food security.

A multi-step process was used to develop and assess the face validity of the Tagalog-language FBC, as follows: (1) translation of text from English to Tagalog by a team of professionals; (2) creation of culturally-appropriate color photographs to accompany text; (3) cognitive testing of the draft instrument with the target population; (4) final review of questionnaire text by the team of professionals; (5) assessment of readability of text; and (6) development of an instruction guide for professionals. The criteria used to determine whether the tool demonstrated adequate face validity were: (1) approval of text and photographs by members of the target population; (2) approval of text and photographs by a team of Tagalog-speaking professionals; and (3) achievement of a readability score appropriate for a low-literacy audience. While there was no quantitative metric used with regards to the first two criteria, face validity was deemed acceptable when all suggestions from the target population and professionals had been addressed. The Institutional Review Board of the University of Hawai'i at Manoa provided approval for this study.

Translation

A team-based approach was used to translate the English-language FBC[10,11] into Tagalog.[23] Three individuals who formed part of the team had the following qualifications: (1) graduate degree in nutrition or public health; (2) fluent in English and Tagalog; and (3) experience working in the limited-resource Filipino population. First, one professional generated a preliminary translation of the survey. The two other professionals then reviewed the translation and made comments in writing. A conference call was held with all three professionals, during which any discrepancies regarding the translation wording were resolved.

Creation of Photographs

The team of three bilingual health professionals also provided guidance regarding food preferences in the Filipino population and generated suggestions for color photographs of Filipino foods to replace the images on the English-language FBC and accompany the text. Suggested items were selected from local markets in Hawai'i containing Filipino foods typically consumed in the population of interest. A graphic design consultant took color photographs using the selected foods reflecting choices of the Filipino population for each behavioral item. While many photographs on the English-language FBC were replaced, others were deemed acceptable for the new population and retained based on the decisions made by the team of health professionals.

Cognitive Testing of Instrument

Subjects. Subjects for cognitive testing were men (n=6) and women (n=14), 18 years or older who were low-income (demonstrated by receipt of or eligibility for SNAP benefits), self-identified as Filipino, and preferred Tagalog rather than English. A convenience sample was used as the most feasible manner of accessing this hard-to-reach population. Recruitment was conducted by a bilingual health professional at churches frequented by limited-resource Filipinos, as well as the Filipino Center on Oahu and other community sites. Thirty-two participants were screened to determine eligibility, and 20 (63%) were deemed eligible based on inclusion criteria.

Interview procedures. Informed consent was obtained from eligible participants. Prior to beginning the interview, participants were asked if they spoke other languages in addition to Tagalog, and this information was recorded. Cognitive testing procedures were then completed with members of the target population. Cognitive testing is a structured interviewing method used to determine whether the target population understands questionnaire items as scientifically intended.[24] The bilingual health professional who conducted recruitment received training in testing procedures from author no 1, who has had extensive experience conducting cognitive interviews in limited-resource populations. The trained professional then performed one-on-one interviews using an interview guide, which outlined a step-by-step procedure for testing of each item and photograph. Reflecting strategies developed by Willis, et al,[24] for each item, the interviewer used the following script: "Look at the question. Respond as you generally would. (Wait) Now go back to the question and tell me in your own words what the question means to you. Next, can you think of a better way to ask this question to make it clearer for another Tagalog speaker? Are

there any words in the question that others may find confusing?" A similar script was used for the response options. For testing of the images, subjects were asked to describe what they saw in the photograph, and state whether there may be a better way to illustrate the question for other Tagalog speakers. Subjects were compensated with a $20 gift card for a local supermarket in exchange for their time.

Between interviews, the questionnaire was revised in an iterative process. This involved the interviewer (author no 2) and author no 1 reviewing participant suggestions periodically, making modifications to text and photographs based on feedback, and using the modified version of the questionnaire to perform further testing. Interviews were discontinued when no new suggestions for modifications to the instrument were suggested. Procedures used reflect standard methods previously employed in assessing the face validity of dietary assessment tools.[9,15–17]

Final Review by Team of Professionals

At the conclusion of cognitive testing, the revised instrument was provided to a team of three professionals drawn from the community and fluent in English and Tagalog for finalization of the wording and photographs. The graphic design expert created a final set of photographs to be included on the tool based on results of cognitive testing and the professionals' comments.

Assessment of Readability

Tools for low-literacy audiences should be designed with text at about a 5th grade reading level.[25] Readability was assessed using the Spache Readability algorithm for Tagalog.[26] This formula takes the following into account to determine readability: (a) sentence length and (b) frequency of common words. Assessment of readability using this formula reveals the grade level of questionnaire text based on the US education system.

Development of Instruction Guide for Professionals

An instruction guide was developed for use by professionals administering the questionnaire as part of the USDA's nutrition education programs, using the same format as that of the existing instruction guides for the English- and Spanish-language food behavior checklists.[27,28] The guide is intended to assist professionals in answering any questions that may arise while the participant is responding to the items on the questionnaire, and contains the following information: (1) the text and images that correspond to each item; (2) a description of the items pictured; (3) an explanation of the information the item is intended to solicit; (4) potential questions from clients responding to questionnaire items; and (5) responses to potential questions that professionals may provide to participants.

Results

Participant Characteristics

Twenty individuals were eligible for study participation. All participants preferred Tagalog rather than English as a requirement for participation in the study, and 14 of the 20 individuals interviewed reported speaking other languages as well. Of these, eight spoke Ilocano, four spoke Kapampangan, one spoke Bikol and one spoke Visayan. No other demographic information was collected as part of the cognitive testing procedures.

Interview Findings

Cognitive interviews revealed several issues with text and photographs, such as preferences for specific terms, and images that did not adequately illustrate the text. Participant comments provided insight into habitually consumed foods as well as the most commonly used vocabulary to describe food items.

A number of changes were made to the text and images based on cognitive testing procedures. Interviews revealed preferences for the use of specific terms to refer to food items, and ways in which text could be reduced while still retaining meaning. For example, in referring to "habits", the word *gawi* was replaced with *ugali*, the preferred term in the target population. Image changes were made to reflect items most commonly consumed in the target population and the form in which they are typically consumed. For example, for an item focused on fruit and vegetable consumption, carrots were replaced with Okinawan sweet potatoes, and cucumber slices were pictured with the skin rather than without. Examples of the most common issues identified during the cognitive testing sessions with low-income Filipino participants with regards to the text and images included in the Tagalog-language FBC are shown in Tables 1 and 2.

Upon reviewing the questionnaire following cognitive testing procedures, the team of professionals agreed with participant suggestions. Assessment of readability of questionnaire text revealed a reading level of grade 5.9.

Results from cognitive interviews, the professional review, and readability assessment indicated that the questionnaire developed met the three aforementioned criteria for adequate face validity. The Tagalog-language tool resulting from all procedures reported is shown in Figure 1.

Discussion

The current study rendered a Tagalog-language FBC found to have acceptable face validity in the limited-resource Filipino population and approved by an expert panel. In this study, face validity was deemed adequate based on the following: (1) approval of text and photographs by members of the target population via cognitive interviews; (2) approval of text and photographs by a panel of professionals using a team-based approach; (3) achievement of a readability score appropriate for a low-literacy audience. Through the use of systematic procedures, suggestions from both participants and professionals were incorporated into development of the tool, ensuring relevance to the target population. These procedures represent the first step in assessment of validity of the questionnaire, and must be followed by additional testing to further examine the psychometric properties of the tool.

As limited-resource Filipinos are at high risk of development of chronic conditions,[2–4] it is important to develop tools that assess behaviors that are associated with obesity and chronic

Table 1. Issues identified related to text on the Tagalog-language questionnaire during cognitive testing sessions with low-income Filipino participants (n=20)

Original item/text	Translated item used for cognitive testing	Issues identified in cognitive testing interviews	Solution proposed by participants	Revised item
Food Behavior Checklist (Title)	Listahan ng mga pag-uugali sa pagkain	The word pag-uugali, meaning "behavior," is not commonly used in everyday speech and is lengthy.	Participants suggested shortening the word pag-uugali to more common and concise version, ugali.	Listahan ng mga ugali sa pagkain
Do you eat 2 or more vegetables at your main meal?	Kumain ka ba ng mas mahigit sa dalawang klaseng gulay sa tanghalian o hapunan?	The word mas is redundant, as mahigit refers to "more than" when used alone.	Participants suggested removing the word mas.	Kumain ka ba ng mahigit sa dalawang klaseng gulay sa tanghalian o hapunan?
Do you use this label when food shopping?	Binabasa mo ba ang mga labels pag namamalengke ka?	The word "label" is ambiguous, and does not necessarily refer to the nutrition label.	Participants suggested adding the word "nutrition" to make it clearer.	Binabasa mo ba ang mga nutrition labels pag namamalengke ka?
Fruit: How much do you eat each day?	Prutas: Gaano karami ang kinakain mo araw araw?	Question is not clear when word prutas, meaning "fruit," is mentioned first.	Participants suggested changing the order of the text to make it clearer.	Gaano karaming prutas ang kinakain mo araw araw?

Table 2. Issues identified related to photographs included on the Tagalog-language questionnaire during cognitive testing sessions with low-income Filipino participants (n=20)

Original photo in English-language questionnaire	Photo used for cognitive testing interviews	Issues identified in cognitive testing interviews	Solution proposed by participants	Revised item
Original photograph for the item "Do you take the skin off chicken?" contained an image of someone taking the skin off of uncooked chicken.	The image of someone taking the skin off of uncooked chicken was retained.	Participants indicated that while skin is sometimes removed before cooking, it is also taken off of cooked chicken before consumption.	Participants suggested picturing removal of skin from chicken both before and after cooking to clearly convey the message that both should be counted in responding.	Revised photograph contains two images, one of someone removing the skin of the chicken before cooking and one of someone removing the skin from cooked chicken.
Original photograph for the item "Do you drink fruit drinks, sport drinks or punch?" contained an image of several beverages: Sunny Delight, Hawaiian Punch, Propel Fitness Water, Gatorade, Country Time Lemonade, Kool-Aid packets.	Photo contained some of the previous beverages and some new: Kool-Aid, Tang, Capri Sun, Powerade, Sunny Delight, Hawaiian Punch.	Clients indicated that while they were familiar with and consumed beverages pictured, there were also several others commonly consumed that should also be shown.	Participants suggested picturing several other beverages commonly consumed in the Filipino population in addition to the American beverages pictured.	Revised photograph contains two additional beverages commonly consumed in the Filipino population, so that items pictured are: Kool-Aid, Tang, Capri Sun, Powerade, Sunny Delight, Hawaiian Punch, Phillippine Mango Juice and Coconut Water.
Original photo for the item "Did you eat red meat or pork yesterday?" contained the following: 1) Plate of cooked beef strips with lettuce and tomato; 2) Plate of chunks of cooked beef with lettuce and tomato; 3) Tostada with ground beef, lettuce and tomato; 4) Tacos with shredded beef and salsa; 5) Plate of raw meat, including ground beef, steak, a pork chop and pig's feet.	Photo was simplified to contain a single plate of raw meat items: goat, beef, pork and liver.	Participants indicated that the meat items would be easier to identify if they were pictured as separate items.	Participants proposed presenting images of each meat item separately rather than all on one plate.	Revised photo contains four separate images of the following items: goat, beef, pork and liver.

Listahan ng mga ugali sa pagkain

Ang mga tanong na ito ay tungkol sa mga balak mong pamamaraan at pagluluto ng pagkain. Pag-isipan kung paano mo gawin ang mga karaniwan gawain.

☐ Pagpasok
☐ Lumabas

Pangalan _____ Petsa _____ ID# _____

1. Kumakain ka ba ng prutas o gulay para sa miryenda?



O Hindi O Oo, minsan O Oo, madalas O Oo, araw araw

2. Umiinom ka ba ng juice na may asukal, sports drink o punch?

O Hindi O Oo, minsan O Oo, madalas O Oo, araw araw

3. Umiinom ka ba ng soft drink?

O Hindi O Oo, minsan O Oo, madalas O Oo, araw araw

4. Umiinom ka ba ng gatas?

O Hindi O Oo, minsan O Oo, madalas O Oo, araw araw

5. Umiinom ka ba ng gatas o nilalagyan mo ba ng gatas ang iyong cereals nitong nakaraan linggo?


O Hindi O Oo

Figure 1

disease. Filipino Americans have previously been shown to fail to meet the recommendations for intake of fruits and vegetables and other dietary components that are important to address for disease prevention.[29] Nutrition education is one way in which a change in habits may be promoted, and programs that have a focus on behavior change have been shown to be effective in altering dietary habits in diverse low-income populations.[30] The behaviors addressed in the FBC, such as increasing intake of fruits, vegetables, and dairy, may be targeted in nutrition education interventions geared toward improving intake and reducing risk of chronic disease. Unlike existing dietary assessment methods such as 24-hour recalls and food frequency questionnaires, the tool requires little time to complete and is easily administered in a group setting.[9]

Among the considerations for the design of such tools for a low-literacy audience is determination of the degree to which the target population comprehends the content. Of note, there have been no previous studies reporting the use of cognitive testing procedures to evaluate Tagalog-language tools, with the current study demonstrating the way in which such interviews may be utilized in the low-income Filipino population. These methods have previously been used to evaluate the face validity of instruments in other underserved populations, such as low-income Spanish-speaking audiences,[16] and have revealed the need to modify instruments per the suggestions of the target population to reflect the preferred vocabulary and food items pertinent to the group in question. Cognitive testing interviews performed in the Filipino population in the current study similarly demonstrated participant preferences with regards to questionnaire content, yielding a tool developed in collaboration with the group in which the tool is to be used. These methods represent an important component of procedures used to develop dietary assessment tools, as they allow the researcher to uncover the thought process of the participant in responding to the items and ensure that the participant's understanding is in line with the scientific intent of the question. Further assessment of validity and reliability of the tool may reveal the need for further cognitive testing procedures to ensure items are best suited to the target population.

As a result of testing with the target population, both text and photographs were altered to reflect participant preferences. General issues uncovered were similar to those revealed in testing the FBC in the Spanish-speaking population.[16] The Spanish-language tool was developed to address the needs of the large Hispanic population in the United States, and is currently in use in the USDA's nutrition education programs.[16,31] Cognitive testing in the Spanish-speaking population indicated the need for changes to photographs such as replacement of some food items originally included on the English-language checklist with others (ie, a can of milk powder instead of chocolate milk), inclusion of members of the target population in images (ie, a Mexican woman instead of an Asian woman consuming an apple), and changing the presentation of some items (ie, whole carrots instead of baby carrots).[16] Similarly, cognitive interviews with Tagalog speakers led to the replacement of some items in the photographs (ie, sweet potato instead of grapes), and changing the presentation of some items (ie, half a papaya instead of chunks of papaya). The resulting tools contain minimal text and color photographs that illustrate item content to address the needs of low-literacy audiences.[32]

The questionnaire resulting from the procedures used in the current study will be appropriate for use in limited-resource Filipinos who prefer Tagalog rather than English. Of note, while Tagalog is the official language of the Philippines, a variety of other languages are also spoken, including both Ilokano and Visayan. Tagalog is, however, the dominant Filipino language spoken in the United States,[12] ensuring that the questionnaire will reach the broadest segment of the population when used as part of the USDA's nutrition education programs.

In addition to selecting the appropriate language for the target population of interest, it is also important to assess the readability of tools developed to ensure they are at the reading level adequate for the group targeted. It has been suggested that the 5th grade level is appropriate for low-literacy audiences, lower than the eighth-grade level often recommended for a general audience.[25] In the current study, the tool developed was found to be at the grade 5.9 reading level, reflecting the recommendations. Of note, while readability of English-language instruments may be calculated using the Flesch Reading Ease formula,[33] the Tagalog language requires use of a different formula, the Spache Readability algorithm.[26] While the Flesch Reading Ease formula takes into account the number of syllables per word and number of words per sentence, the Spache Readability algorithm disregards syllable length. In assessing readability, it is important to select the correct tool for use, as components examined vary depending on the language in question.

Limitations

The Tagalog version of the FBC evaluated in this study was tested in a sample of Filipinos residing in Hawai'i. Results may not be generalizable to Tagalog speakers residing in other parts of the United States. However, the team of translators included one professional from the US mainland, who had similar suggestions regarding questionnaire wording and photos to the professionals from Hawai'i. In addition, the current study only examined face validity of the instrument, which is the first step in the validation process. To determine the acceptability of the tool for use in evaluating the USDA's nutrition education programs, further testing must be performed to determine the degree to which multiple administrations of the tool yield consistent results, and whether responses on the questionnaire adequately correlate with measures of dietary intake such as food records or serum indicators. These measures will allow for assessment of convergent validity and reliability. The current study represents a preliminary step in the validation of the checklist and must be followed by additional research.

Conclusions

The procedures described in the current study, including translation of text by a team of professionals, creation of color

photographs, and cognitive testing with members of the target population, yielded an instrument measuring dietary behaviors found to have adequate face validity. This study represents the first step in development of a tool that will inform programs aimed at preventing diet-related chronic disease in the low-income Filipino population both in Hawai'i and the continental US. To assess the degree to which this tool is correlated with other measures of dietary intake and demonstrates adequate consistency when administered at several time points, a subsequent study should be performed to assess criterion and convergent validity, as well as reliability. The rigorously validated FBC may be used in the USDA's nutrition education programs to set goals for sessions planned, as well as to evaluate behavior change resulting from participation in these programs. Programs may be tailored based on results from checklist administration to most appropriately address the needs of the low-income Filipino population and ultimately reduce health disparities.

Conflict of Interest

None of the authors identify any conflict of interest.

Acknowledgements

The authors acknowledge the efforts of Brandon Ng in creating the photographs and designing the questionnaire, and Lorilyn Salamanca and Marilen Mojica-Howard in translating the instrument. The authors also acknowledge the participants in the study. The project was supported by grant number #2U54MD007584-04 from the National Institute on Minority Health and Health Disparities (NIMHD), a component of the National Institutes of Health (NIH), and its contents are solely the responsibility of the authors and do not necessarily represent the official view of NIMHD or NIH.

Authors' Affiliations:
- Department of Human Nutrition, Food, and Animal Sciences, University of Hawai'i at Manoa, Honolulu, HI (JCB, ST)
- Office of Public Health Studies, University of Hawai'i at Manoa, Honolulu, HI (OVB)

Correspondence to:
Jinan C. Banna PhD, RD, CDN; Assistant Professor, Department of Human Nutrition, Food, and Animal Sciences, College of Tropical Agriculture and Human Resources, Agricultural Sciences, University of Hawai'i at Manoa; 1955 East-West Road, Honolulu, HI 96822; Ph: (808) 956-7857; Email: jcbanna@hawaii.edu

References

1. United States Census Bureau. The Asian population: 2010 census briefs. http://www.census.gov/prod/cen2010/briefs/c2010br-11.pdf. Published March 2012. Accessed April 18, 2015.
2. Staimez LR, Weber MB, Narayan KMV, Oza-Frank R. A systematic review of overweight, obesity, and type 2 diabetes among Asian American subgroups. *Curr Diabetes Rev*. 2013;9(4):312-331.
3. Pobutsky A, Balabis J, Nguyen D-H, Tottori C. Hawai'i diabetes report 2010. Honolulu: Hawai'i State Department of Health, Chronic Disease Management and Control Branch, Diabetes Prevention and Control Program. http://www.hawaiihealthmatters.org/javascript/htmleditor/uploads/DOH_DiabetesReport2010_Lo.pdf. Published 2010. Accessed April 18, 2015.
4. Barnes PM, Adams PF, Powell-Griner E. Health characteristics of the Asian adult population: United States, 2004-2006. *Adv Data*. 2008;(394):1-22.
5. Hawaii Health Data Warehouse, Hawaii State Department of Health, Behavioral Risk Factor Surveillance System. Diabetes - Prevalence, by State, County, Island, Community, BRFSS Age Group, DOH Race-Ethnicity, Gender, Education Level, Employment Status (Grouped), Household Income, Poverty Level, Marital Status (Grouped), Married, Health Care Coverage, for the Year(s) - 2011, 2012, 2013. http://www.hhdw.org/cms/uploads/Data%20Source_%20BRFFS/Diabetes/BRFSS_Diabetes_IND_00001_2011.pdf. Published 2015. Accessed July 21, 2015.
6. Hawaii Health Data Warehouse, State of Hawaii, Hawaii School Health Survey. Youth Risk Behavior Survey Module, Overweight & Obesity by School Type, State, Gender, Grade Level, and DOH Race-Ethnicity for the Years 2003 - 2013. http://www.hhdw.org/cms/uploads/Data%20Source_%20YRBSS/YRBS_Healthy%20Lifestyles_IND_00011.pdf. Published 2014. Accessed July 21, 2015.
7. Hawaii Health Data Warehouse; Hawaii State Department of Health, Behavioral Risk Factor Surveillance System. Weight - Expanded BMI, for the State of Hawaii, for the Year(s) - 2011, 2012, 2013. http://www.hhdw.org/cms/uploads/Data%20Source_%20BRFFS/Weight/BRFSS_Weight%20Control_IND_00008_2011.pdf. Published 2015. Accessed July 21, 2015.
8. Hersey J, Cates S, Blitstein J, Williams P. SNAP-Ed can improve nutrition of low-income Americans across life span. http://www.rti.org/pubs/rr-0023-1406-cates.pdf. Published 2014. Accessed April 18, 2015.
9. Townsend MS. Evaluating food stamp nutrition education: process for development and validation of evaluation measures. *J Nutr Educ Behav*. 2006;38(1):18-24. doi:10.1016/j.jneb.2005.11.008.
10. Murphy SP, Kaiser LL, Townsend MS, Allen LH. Evaluation of validity of items for a food behavior checklist. *J Am Diet Assoc*. 2001;101(7):751-761. doi:10.1016/S0002-8223(01)00189-4.
11. Townsend MS, Kaiser LL, Allen LH, Joy AB, Murphy SP. Selecting items for a food behavior checklist for a limited-resource audience. *J Nutr Educ Behav*. 2003;35(2):69-77.
12. Ryan C. Language Use in the United States: 2011. American community survey. US Census Bureau; 2013:8-11. https://www.census.gov/prod/2013pubs/acs-22.pdf. Accessed April 18, 2015.
13. United States Census Bureau. Selected Social Characteristics in the United States, 2006-2010 American Community Survey Selected Population Tables. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_SF4_DP02&prodType=table. Published 2010. Accessed July 21 2015.
14. Johnson-Kozlow M, Matt GE, Rock CL, de la Rosa R, Conway TL, Romero RA. Assessment of dietary intakes of Filipino-Americans: implications for food frequency questionnaire design. *J Nutr Educ Behav*. 2011;43(6):505-510. doi:10.1016/j.jneb.2010.09.001.
15. Litwin M. *How to Measure Survey Reliability and Validity*. Thousand Oaks, California: Sage Publications; 1995.
16. Banna JC, Vera Becerra LE, Kaiser LL, Townsend MS. Using qualitative methods to improve questionnaires for Spanish speakers: assessing face validity of a food behavior checklist. *J Am Diet Assoc*. 2010;110(1):80-90. doi:10.1016/j.jada.2009.10.002.
17. Nunnally J, Bernstein I. *Psychometric Theory*. Vol Third. New York, NY: McGraw-Hill; 1994.
18. Kelishadi R, Majdzadeh R, Motlagh M-E, et al. Development and evaluation of a questionnaire for assessment of determinants of weight disorders among children and adolescents: The Caspian-IV Study. *Int J Prev Med*. 2012;3(10):699-705.
19. Whati LH, Senekal M, Steyn NP, Nel JH, Lombard C, Norris S. Development of a reliable and valid nutritional knowledge questionnaire for urban South African adolescents. *Nutrition*. 2005;21(1):76-85. doi:10.1016/j.nut.2004.09.011.
20. Sitnick S, Ontai L, Townsend M. What parents really think about their feeding behaviors: Considerations for parent feeding assessments and education programs. *J Hum Sci Ext*. 2014;2(2):84-92.
21. Steyn NP, Labadarios D, Nel JH, Heidi-Lee R. Development and validation of a questionnaire to test knowledge and practices of dietitians regarding dietary supplements. *Nutrition*. 2005;21(1):51-58. doi:10.1016/j.nut.2004.09.008.
22. Talip W, Steyn NP, Visser M, Charlton KE, Temple N. Development and validation of a knowledge test for health professionals regarding lifestyle modification. *Nutrition*. 2003;19(9):760-766.
23. Geisinger KF. Cross-cultural normative assessment: Translation and adaptation issues influencing the normative interpretation of assessment instruments. *Psychol Assess*. 1994;6(4):304-312. doi:10.1037/1040-3590.6.4.304.
24. Willis G. *Cognitive Interviewing and Questionnaire Design: A Training Manual.* US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics; 1994.
25. Contento I. *Nutrition Education: Linking Research, Theory, and Practice*. Jones & Bartlett Publishers; 2010.
26. Spache G. *Good Books for Poor Readers*. Champaign, Illinois: Garrard Publishing Co.; 1966.
27. Banna J, Townsend M, Vera Becerra L, et al. Administering the Food Stamp Program Lista de hábitos alimenticios (Food Behavior Checklist) for Spanish speakers: Instruction Guide. English and Spanish. Townsendlab Web site. 2008. http://Townsendlab. ucdavis.edu. Accessed April 3, 2015.
28. Townsend M, Davidson C, Leavens L, Metz D, Martin A. Administering the Food Stamp Program Food Behavior Checklist: Instruction Guide. Townsendlab Web site. 2008. http://Townsendlab.ucdavis.edu. Accessed April 3, 2015.
29. Serafica RC, Lane SH, Ceria-Ulep CD. Dietary acculturation and predictors of anthropometric indicators among Filipino Americans. *SAGE Open*. 2013;3(3):2158244013495543. doi:10.1177/2158244013495543.
30. Ammerman AS, Lindquist CH, Lohr KN, Hersey J. The efficacy of behavioral interventions to modify dietary fat and fruit and vegetable intake: a review of the evidence. *Prev Med*. 2002;35(1):25-41.
31. Banna JC, Townsend MS. Assessing factorial and convergent validity and reliability of a food behaviour checklist for Spanish-speaking participants in US Department of Agriculture nutrition education programmes. *Public Health Nutr*. 2011;14(7):1165-1176. doi:10.1017/S1368980010003058.
32. Townsend MS, Sylva K, Martin A, Metz D, Wooten-Swanson P. Improving readability of an evaluation tool for low-income clients using visual information processing theories. *J Nutr Educ Behav*. 2008;40(3):181-186. doi:10.1016/j.jneb.2007.06.011.
33. Kincaid J, Fishburne R, Rogers R, Chissom B. Derivation of New Readability Formulas (Automated Readability Index, Fog Count and Flesch Reading Ease Formula) for Navy Enlisted Personnel. 1975.

Acute Rheumatic Carditis: A Rare Cause for Reversible Complete Heart Block

Omar A. Abdul Ghani MBBS and David Singh MD

Abstract

A previously healthy 18-year-old man presented to the emergency department with weakness, fever, and joint pains and was found to have complete heart block with transient asystole requiring urgent transvenous pacing. After further workup, the patient was found to have complete heart block secondary to acute rheumatic carditis. The conduction system recovered in a step-wise fashion following treatment with Penicillin, and high dose Aspirin, without the need for permanent pacemaker placement. This case illustrates that acute rheumatic carditis, although rare, can present with advanced conduction system involvement, which is reversible if treatment is initiated.

Introduction

The differential diagnosis for complete heart block in a young patient is limited and includes congenital complete heart block, and acquired complete heart block secondary to multiple etiologies including: trauma, infections, and inflammatory conditions such as myocarditis, sarcoidosis, and auto-immune disorders. Muscular dystrophies are also known to be associated with AV block in young patients, particularly the Myotonic sub-type.[1]

Cardiac conduction system involvement has been reported as a feature of acute rheumatic carditis, with involvement ranging from first degree atrio-ventricular (AV) block (72.5%), second degree AV block (2.6%) and rarely complete AV block (0.6%) based on previous case reports.[2] Acute rheumatic fever (ARF) is an auto-immune sequela that occurs two to four weeks following group A streptococcal pharyngitis and involves multiple organ systems: Musculoskeletal (migratory arthritis), cardiovascular (carditis and valvulitis and conduction system disorders), central nervous system (chorea), and skin (erythema marginatum, and subcutaneous nodules). Worldwide, there are an estimated 250,000 - 470,000 new cases of rheumatic fever each year.[3,4] Most cases of ARF occur in the developing world and are relatively uncommon in the United States,[4] where the incidence of ARF is 2 to 14 cases per 100,000.[5] ARF is more common in Hawai'i with an estimated incidence of 9.5 cases per 100,000.[6] It has been suggested that this may be attributable to unique and potentially more virulent strains of group A streptococci affecting the inhabitants of the Hawaiian islands.[7]

We present a case of complete heart block secondary to acute rheumatic carditis, basic diagnosis, and management principles.

Case Description

An 18-year-old man with no significant past medical history presented to a community hospital complaining of nausea, vomiting, and weakness for five days. His symptoms began about 24 hours after consuming fish at a family picnic. He also reported history of sore throat over the past two to three weeks prior to presentation. Initial vital signs revealed a blood pressure of 126/66 mmHg, heart rate of 48 beats per minute, respiratory rate of 18 breaths per minute, and a temperature of 37.1 °C (98.8 °F). Mild tenderness and swelling was noted in the right ankle. No skin rash was noted. None of his family members experienced similar symptoms and he had no sick contacts. He did not have any travel history over the past year prior to presentation and denied any history of recent animal contacts or insect bites.

An electrocardiogram (ECG) in the emergency room revealed complete heart block with a wide complex rhythm with a left bundle branch morphology suggestive of a ventricular escape rhythm at approximately 50 beats per minute (Figure 1). While performing a second ECG the patient was noted to have a transient loss of his escape rhythm and subsequent ventricular asystole indicative of cardiac arrest (Figure 2). Shortly after a temporary transvenous pacemaker was placed, the patient was transferred to our facility for further evaluation and consideration for permanent pacemaker placement.

Initial laboratory data revealed sodium level: 128 mEq/L (normal range, 133-145 mEq/L), potassium level: 3.4 mEq/L (3.3-5.1 mEq/L), chloride level: 93 mEq/L (95-108 mEq/L), bicarbonate level: 25 mEq/L (21-30 mEq/L), calcium level: 9.2 mg/dL (8.3-10.5 mg/dL), creatinine: 0.9 mg/dL (0.6-1.4 mg/dL). White blood cell count: 11.4 X 10^3/ uL (3.84 X 10^3- 9.84 X 10^3 /uL), hemoglobin: 12.8 g/dL (13.7-17.5 g/dL), platelet count: 312 X 10^3/ uL (151 X 10^3 - 424 X 10^3 /uL), troponin level: <0.02 ng/mL (< 0.05 ng/mL), erythrocyte sedimentation rate (ESR): 127 mm/hour (0-15 mm/hour), C-reactive protein (CRP): 229 mg/L (0-10 mg/L), thyroid stimulating hormone (TSH): 1.55 uIU/mL (0.27-4.2 uIU/mL). Chest X-ray on presentation was unremarkable.

Given his antecedent consumption of fish and the presence of gastrointestinal symptoms on presentation (nausea and vomiting), as well as reports of Ciguatera poisoning in the Pacific Islands, this diagnosis was initially considered but was quickly ruled out following confirmation the fish consumed was tuna (not a reef fish associated with Ciguatera poisoning) and absence of similar symptoms in family members who also consumed the fish.

On hospital day two the patient reported right knee pain and was found to have fever at 39.2 °C (102.5 °F). Physical examination revealed mild swelling, redness, and tenderness in right knee. Given his history of sore throat, subsequent development of fever, and the findings suggestive of migratory arthritis the diagnosis of ARF was considered. An Anti Streptolysin O (ASO) titer was performed and found to be elevated at 441 IU/mL (normal <200 IU/mL). An echocardiogram demonstrated

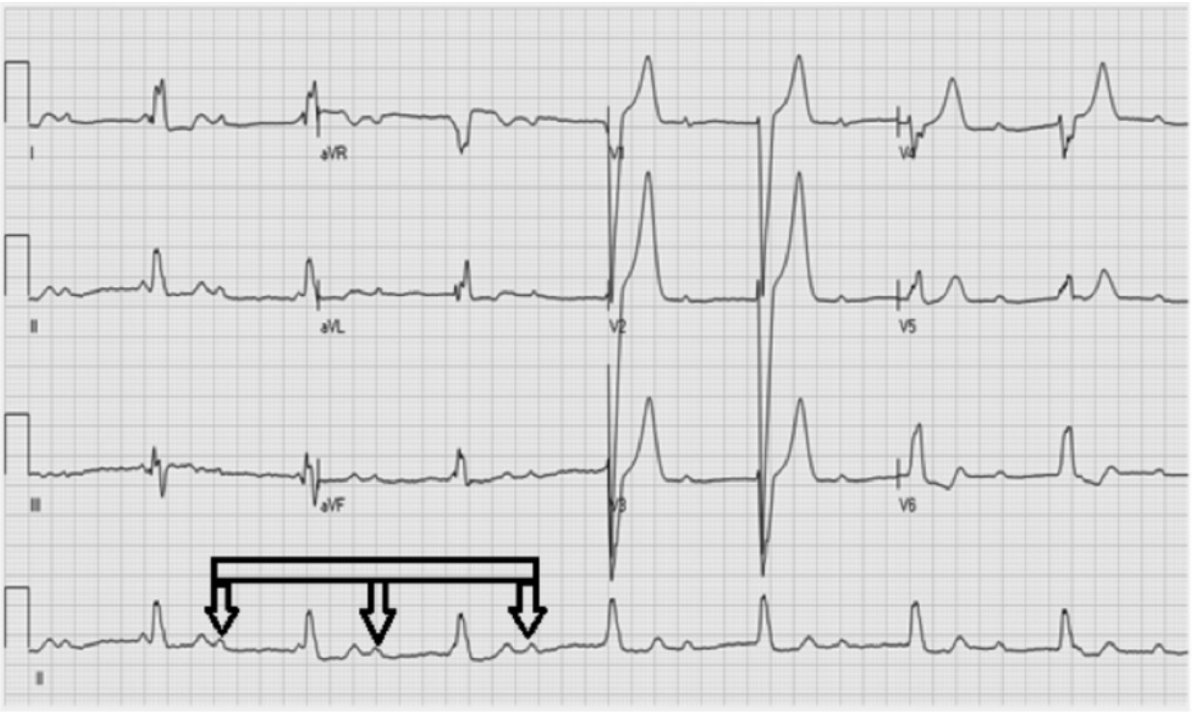


Figure 1. Initial ECG demonstrating complete heart block and a wide complex ventricular escape rhythm with a left bundle branch morphology (arrows showing atrial activity that is completely dissociated from the ventricular activity).

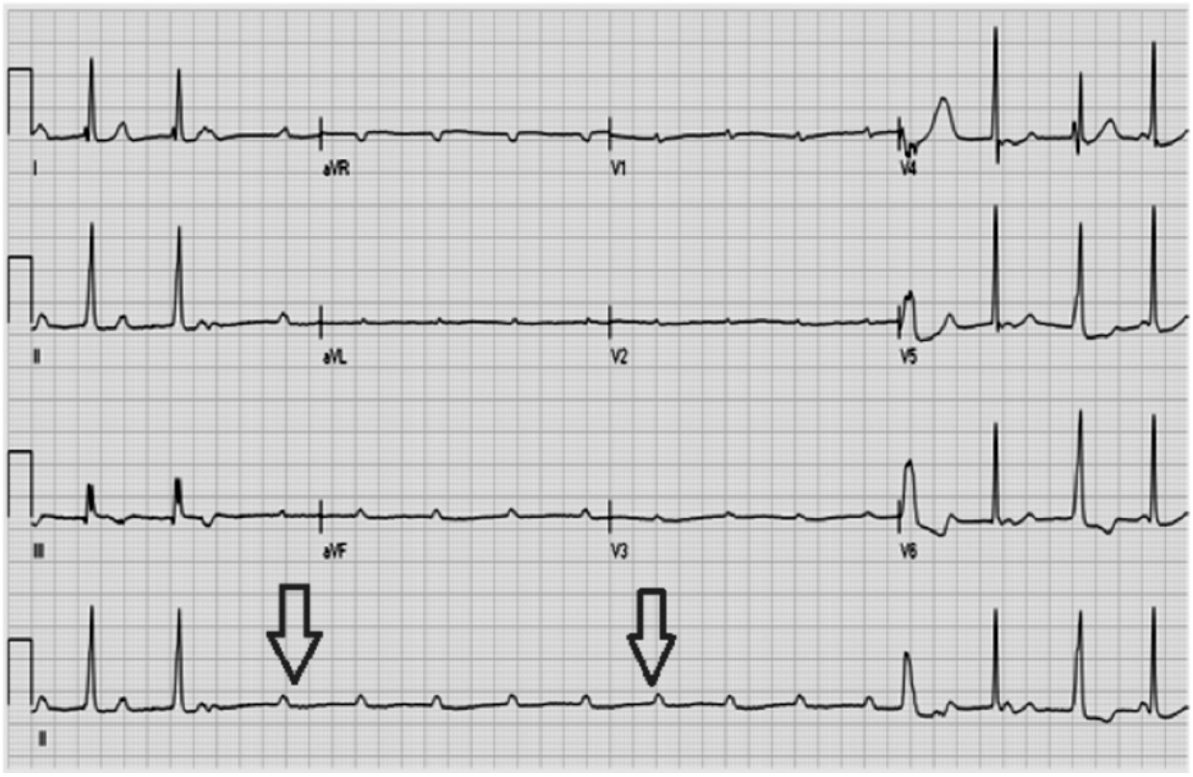


Figure 2. Transient ventricular asystole (cardiac arrest) shortly after initial ECG (arrows showing P waves documenting atrial activity with no subsequent ventricular conduction).

Figure 3. Rhythm strips following treatment for acute rheumatic fever: (A) Arrows showing second degree type I (Wenkebach) AV block, (B) Prolonged PR (230 msec), (C) Near-normalization of PR (200 msec).

preserved left ventricular ejection fraction with a trace aortic regurgitation. Our patient had two major components (carditis and migratory arthritis) as well as multiple minor components (fever, elevated ESR, and CRP) of the Jones criteria.[8] Thus, the diagnosis of ARF was established.

Treatment with Penicillin and high dose Aspirin was initiated. Shortly thereafter, the patient's AV conduction improved in a stepwise fashion with Wenkebach periodicity, followed by prolonged AV conduction, and then near-normalization of the PR interval (Figure 3). The patient was then placed on secondary prophylaxis with monthly intramuscular Penicillin. He was discharged on high dose Aspirin with instructions for tapering and was then seen in the clinic one month later with improvement of his symptoms.

Discussion

Our patient's history, presentation, as well as diagnostic workup was consistent with acute rheumatic carditis. He did not have any recent travel history to areas endemic with Lyme disease and he had no associated skin lesions; thus, this diagnosis was excluded. He did not have associated muscle weakness or family history to suggest muscular dystrophies. He also did not have respiratory, renal, or skin features to suggest sarcoidosis or other autoimmune diseases. Myocarditis was also less likely with negative troponin markers and no history of chest pain.

Ciguatera poisoning is a toxin-related illness resulting from the consumption of infected reef fish in endemic regions. It is commonly seen in the Pacific Islands and the Caribbean. It is estimated that 10,000-50,000 people per year who live in or visit tropical and subtropical areas suffer from Ciguatera Poisoning.[9] In Hawai'i, there is a total of 3 to 69 cases per year, averaging 28.5 total cases per year from 2002-2011,[10] but the true incidence is difficult to ascertain due to under-reporting. Poisoning typically causes gastrointestinal symptoms (nausea, vomiting, cramping, and diarrhea), neurological symptoms (paresthesia), and cardiovascular symptoms (hypotension and severe bradycardia and AV block).[9,11] Ciguatera Poisoning was initially considered given his recent ingestion of fish but was excluded given the type of fish consumed and the absence of similar symptoms in his family members.

To our knowledge there have only been a total of 25 published case reports of AV block in the setting of acute rheumatic fever, five of which were adult patients.[12] Of these, only four were from the United States. Filberbaum and colleagues described cases of ARF associated AV block as early as 1945 with no clear description regarding the severity of conduction involvement.[13] In subsequent years there have been sporadic reports of AV block associated with ARF in the United States.[14-16] Of the 25 reported cases, 15 were found to be reversible following treatment of ARF and one case persisted at 3 months.[12] Carano and colleagues presented a case of a 14 year old boy who had a very similar presentation and history as our case.[12] That patient first presented with acute rheumatic fever and carditis. The patient's echocardiographic study also documented minimal aortic regurgitation which, like our case, suggests that typical valvular involvement in cases of rheumatic carditis may not necessarily be present and features of carditis may only be the conduction system involvement. Lenox and colleagues presented a case of complete heart block in acute rheumatic carditis.[15] This was the patient's second attack of rheumatic fever, which

suggests that this type of conduction system involvement does not necessarily happen with first attacks of rheumatic carditis.

Treatment of conduction system involvement with ARF resulting carditis follows the same basic principles of ARF treatment. Consideration should be given to the use of a temporary transvenous pacemaker placement in patients with advanced symptomatic AV involvement. Treatment for Group A streptococcal infection should be initiated regardless of the presence of active pharyngitis. Treatment includes either oral Penicillin for 10 days or single dose of intramuscular Penicillin.[17] High dose Aspirin (4-8 g/24 hours) is the most effective anti-inflammatory agent for active arthritis. The role of systemic corticosteroids is less clear and may not provide additional benefit compared to Aspirin monotherapy.[18] Carano and colleagues' patient received steroid as part of his treatment regimen,[12] but our patient showed favorable response to Aspirin and Penicillin only. Secondary prevention for recurrent ARF should also be provided after treatment during the acute phase. Daily Penicillin treatment or monthly intramuscular injections should be used. For patients with a history of carditis (including conduction system involvement) the treatment duration is at least 10 years after the initial attack or until age 40 years, whichever is longer. It has been suggested that patients with a history of severe carditis should receive lifelong prophylaxis.[17]

Conclusion

We present a rare case of complete heart block associated with acute rheumatic carditis. Although rare, this diagnosis should be considered in patients with complete heart block particularly when it is associated with other features of ARF. As evidenced by this and several other cases, conduction disorders associated with ARF often resolve following appropriate treatment without the need for permanent pacemaker placement.

Conflict of Interest

None of the authors identify a conflict of interest.

Authors' Affiliation:
- The Queen's Medical Center, University of Hawai'i John A. Burns School of Medicine, Honolulu, HI

Correspondence to:
Omar Abdul Ghani MBBS; The Queen's Medical Center, 1301 Punchbowl St., Pauahi 3rd fl., Honolulu, HI, 96813; Email: omar77@hawaii.edu

References

1. Prystowsky EN, Pritchett EL, Roses AD, Gallagher J. The natural history of conduction system disease in myotonic muscular dystrophy as determined by serial electrophysiologic studies. *Circulation.* Dec 1979;60(6):1360-1364.
2. Clarke M, Keith JD. Atrioventricular conduction in acute rheumatic fever. *British Heart Journal.* May 1972;34(5):472-479.
3. Carapetis JR. Rheumatic heart disease in developing countries. *New Eng J Med.* Aug 2 2007;357(5):439-441.
4. Seckeler MD, Hoke TR. The worldwide epidemiology of acute rheumatic fever and rheumatic heart disease. *Clinical Epidemiology.* 2011;3:67-84.
5. Miyake CY, Gauvreau K, Tani LY, Sundel RP, Newburger JW. Characteristics of children discharged from hospitals in the United States in 2000 with the diagnosis of acute rheumatic fever. *Pediatrics.* Sep 2007;120(3):503-508.
6. Chun LT, Reddy DV, Yim GK, Yamamoto LG. Acute rheumatic fever in Hawaii: 1966 to 1988. *Hawaii J Med.* Aug 1992;51(8):206-211.
7. Erdem G, Mizumoto C, Esaki D, Abe L, Reddy V, Effler PV. Streptococcal emm types in Hawaii: a region with high incidence of acute rheumatic fever. *The Pediatric Infectious Disease Journal.* Jan 2009;28(1):13-16.
8. Guidelines for the diagnosis of rheumatic fever. Jones Criteria, 1992 update. Special Writing Group of the Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease of the Council on Cardiovascular Disease in the Young of the American Heart Association. *JAMA.* Oct 21 1992;268(15):2069-2073.
9. Friedman MA, Fleming LE, Fernandez M, et al. Ciguatera fish poisoning: treatment, prevention and management. *Marine Drugs.* 2008;6(3):456-479.
10. Copeland NK, Palmer WR, Bienfang PK. Ciguatera fish poisoning in Hawai'i and the Pacific. *Hawaii J Med Public Health.* Nov 2014;73(11 Suppl 2):24-27.
11. Tilman A. Ruff RJL. Clinical aspects of ciguatera: an overview. *Pacific Health Dialogue.* 1997;4(2):119-127.
12. Carano N, Bo I, Tchana B, Vecchione E, Fantoni S, Agnetti A. Adams-Stokes attack as the first symptom of acute rheumatic fever: report of an adolescent case and review of the literature. *Italian Journal of Pediatrics.* 2012;38:61.
13. Filberbaum MB, Griffith GC, Solley RF, Leake WH. Electrocardiographic Abnormalities in 6,000 Cases of Rheumatic Fever. *California and Western Medicine.* Jun 1946;64(6):340-346.
14. Barold SS, Sischy D, Punzi J, Kaplan EL, Chessin L. Advanced atrioventricular block in a 39-year-old man with acute rheumatic fever. *Pacing and clinical electrophysiology : PACE.* Nov 1998;21(11 Pt 1):2025-2028.
15. Lenox CC, Zuberbuhler JR, Park SC, Neches WH, Mathews RA, Zoltun R. Arrhythmias and Stokes-Adams attacks in acute rheumatic fever. *Pediatrics.* Apr 1978;61(4):599-603.
16. Stocker FP, Czoniczer G, Massell BF, Nadas AS. Transient complete A-V block in two siblings during acute rheumatic carditis in childhood. *Pediatrics.* May 1970;45(5):850-856.
17. Gerber MA, Baltimore RS, Eaton CB, et al. Prevention of rheumatic fever and diagnosis and treatment of acute Streptococcal pharyngitis: a scientific statement from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee of the Council on Cardiovascular Disease in the Young, the Interdisciplinary Council on Functional Genomics and Translational Biology, and the Interdisciplinary Council on Quality of Care and Outcomes Research: endorsed by the American Academy of Pediatrics. *Circulation.* Mar 24 2009;119(11):1541-1551.
18. Cilliers A, Manyemba J, Adler AJ, Saloojee H. Anti-inflammatory treatment for carditis in acute rheumatic fever. *The Cochrane Database of Systematic Reviews.* 2012;6:CD003176.

MEDICAL SCHOOL HOTLINE

The Magical World of Medicine

Jill S.M. Omori MD

The Medical School Hotline is a monthly column from the John A. Burns School of Medicine and is edited by Satoru Izutsu PhD; HJMPH Contributing Editor. Dr. Izutsu is the vice-dean of the University of Hawai'i John A. Burns School of Medicine and has been the Medical School Hotline editor since 1993.

Good evening Dean Hedges, Regent Portnoy, Judge Burns, fellow faculty and alumni, family, friends, and of course the newest addition to our JABSOM Ohana…the Class of 2019. You may be wondering why I am wearing Mickey Mouse Maleficent ears on this auspicious occasion where I am supposed to be talking about professionalism and compassion in medicine. Well, there is actually a very good reason, other than the fact that I happen to love all things Disney. This past summer I visited Disneyland with my family and it got me thinking about the similarities between medicine and Disney, and surprisingly there are many. In fact, there are many lessons that we in the medical field can learn from both Disney as well as from one of its most misunderstood villains, Maleficent.

First of all, there is the sheer excitement factor that is associated with Disney. Children all around the world, and many times adults too, dream of the day when they can visit Disneyland or Disney World, and when they finally get there it is nothing less than amazing. The parks are filled with wonder and amusement, and people witness things beyond their wildest imaginations. I would guess that this is the same type of anticipatory excitement you felt about going to medical school. Many of you may have been dreaming of this day for a very long time, and now it has finally arrived. On Monday, as you came to JABSOM for the first time as medical students, I saw the same wonder and awe in your eyes that little kids have when they step into the magical world that Walt Disney created for all of us. There is so much for you to do, see, and learn and I am sure that you can't wait to dive right in to start experiencing all of it. And I promise you that it will be incredibly wondrous and magical and that it will be the best rollercoaster ride you have ever been on. Fast paced and thrilling, full of ups and downs, and it will sometimes make your stomach turn, but hopefully it will always fill your heart with joy and your soul with contentment.

But while you are basking in the excitement of finally reaching medical school, and taking in all of the cool and exciting innovations of the world of medicine, you need to remember one of the more important similarities between our world and the Magical World of Disney; and that is the unequaled professionalism that Disney expects from all of its employees, from the custodial staff all the way up to their high level executives. Disney has extremely high standards for its employees, which is the reason why everyone you meet greets you with a smile and a kind word, no matter how tired or hot they may be, why their parks are always very clean and why every "cast member" can answer most of your questions without looking irritated or inconvenienced, and it is why all of them put the needs of their customers first and why we truly feel like it is the happiest place on earth. Having gone to two amusement parks on my trip this summer, I can tell you that there was a significant difference in the experience between going to Disneyland and the other unnamed park. The professionalism of the Disney "cast members" made waiting in the long lines, paying high prices for the tickets, food, and souvenirs, and putting up with the other park goers seem trivial and definitely helped us to have a wonderful experience. In comparison, though the other park may have had better rides, the employees were sometimes rude and didn't know what was going on, you could tell that they were tired and didn't want to be there, and it made the whole experience rather disappointing. The level of professionalism that Disney demands is even more important in the medical field and is what we should all aspire to as physicians. Your patients are coming to you with needs and fears, sometimes at incredibly vulnerable moments in their lives, and they will expect you to treat them not only with competence but also with compassion. As you don your white coats for the first time tonight and recite the Hippocratic oath, do not simply go through the motions of saying the words but I ask you to pay close attention to the ideals that you are committing to while taking this oath. You must push yourself to a standard higher than you ever have; for this is what your patients expect, but more importantly it is what your patients deserve.

This evening, your white coat ceremony is being generously sponsored by Dr. William Haning and Dr. Libby Char in memory of one of my dear faculty mentors, Dr. Gwen Naguwa. Dr. Naguwa was the epitomy of professionalism and had extremely high standards for herself as well as the students she taught and mentored. This brings me to my favorite Disney villain, Maleficent. When I was applying to medical school, Dr. Naguwa was the Dean of Students and was one of my medical school interviewers. I had heard horror stories of how scary she was and after leaving her office in tears, I believed those stories and thought I would never get in. Thankfully, I

did get in and over the next four years, and many more years later as her colleague, I gained a tremendous amount of respect for this physician whom I was initially scared to death of. As we learned in the movie Maleficent, she was also feared by many as well and viewed as the mistress of all evil, when in fact she was a kind and generous leader of her people and was just extremely protective of those she loved and cared for and would do whatever was needed to fight for what she believed was right. This was Dr. Naguwa, sometimes misunderstood by her scared students, but a fierce champion of professional integrity, compassionate care, and excellence in medicine, who only wanted to ensure that her students pushed themselves to reach their true potentials so that they could become the best possible physicians for their future patients. When you got to know her, you realized that she was sweet and caring like a Disney Princess with the fire and determination of Maleficent. You will find many of these "Maleficent" type medical faculty along your journey through medical school and residency. Do not be too quick to judge them or paint them as just another "villain" that wants to pimp you to death, but rather listen very carefully to what they are trying to teach you and learn everything you can to help you to become more than you imagined you could be. One of Disney's philosophies is that "good enough is never good enough", and this should also be true for us. Dr. Naguwa inspired me to be a better physician and more importantly a better person, never settling for good enough. As you start your PBL cases next week, you will often hear the term N9 for studying the main topic of the case. You should know that this actually is short for Naguwa 9 and was named after Dr. Naguwa who always emphasized to her PBL groups the importance of being thorough and knowledgeable about all aspects of a patient's illness.

The other lesson we learn from Maleficent, is that you should never judge someone before knowing their story. I believe that this is extremely important for physicians to keep in mind when dealing with their patients. As many of you know, my clinical work and passion in medicine is in helping provide health care for the homeless. It is always disheartening for me to hear people making assumptions about these individuals without really trying to understand what their situation really is or thinking about who they really are as human beings and not just as a generic homeless person on the street. It is even more distressing when medical professionals make these comments, because I feel that we should know better and have a clearer understanding of the social determinants that underlie the reasons why many of these individuals ultimately become homeless. I ask my students that work in our free clinics to take the time to find out their patient's stories. Who are they, how did they get to where they are, and how they are handling their current situation. Many of our students find that their attitudes towards treating the homeless change significantly after truly learning about the unique individuals behind the ugly face of the problem of homelessness.

And like with Disney, it is the story that is truly important. Your patients' stories will help you tremendously to provide them with compassionate and culturally competent care, so please ask the right questions, listen carefully to what they have to say, and always remember what an incredible privilege it is that they are sharing these stories with you. One day at our Waianae clinic, a student was obviously getting frustrated while interviewing one of our patients that was being seen for abdominal pain. This particular patient had severe liver disease and suffered several complications from this illness. The student was frustrated because the patient continued to drink alcohol and did not seem interested in quitting despite having a very serious illness that was caused by her long history of drinking. He tried in vain to counsel this patient about why it was important for her to stop drinking, but the patient just got more and more irritated with him. When he came to present the patient to me, he was clearly exasperated and just wanted to move on to the next patient. I asked him if he knew how long the patient had been drinking to which he replied, "a long time…that's what she said". I asked him if he had inquired more about how long she really had been drinking or if he had explored with her why she did not think she could quit, to which he replied "no". It turns out that I knew this patient and what her story was. In fact, she had been drinking for a very long time, from the time that she was 3 years old. Her parents, who were both alcoholics, would give her alcohol to make her go to sleep. Alcohol had always been a part of her life growing up and she had free access to all of it. It was the only life she knew and became a part of who she was. She had also tried to quit on multiple occasions as an adult, but being homeless and without many resources, had been unable to get the necessary support to enable her to be successful. After learning this, the student remarked that it was like putting on a new pair of glasses and truly seeing the patient for the first time. Though I understand it is more and more difficult in this age of endless paper work and having to meet quality and performance measures, please try your best to take the time to talk with your patients and find out their stories. While it is extremely important and necessary to be a competent and knowledgeable physician, what will set you apart is your professionalism, compassion, and heart. Your patients will not care what your score was on your USMLE exams or how many honors grades you received in your third year clerkships, but they will care about how you comforted them when they received their diagnosis of cancer, how you were patient with them at 2 in the morning when they were concerned about their child's fever, and how you carefully explained the treatment options for their loved ones heart condition. Just as my experience at Disneyland was so much better than at the other theme park, you can truly make a difference in providing your patients and their families with a better health care experience.

Finally, I also wore these ears to emphasize the importance of being able to have fun and not take yourself too seriously. Because we deal with serious issues, that sometimes have life or death consequences, and we are constantly burdened with the bureaucracy and red tape of the business side of medicine, it is extremely important to take care of and nourish our body, mind, and spirit so that we will avoid burn out and not get our

humanity beaten out of us. So every so often, let your inner child out and do the things that truly make you happy. Make sure you spend time with your friends and family that have supported you and will continue to support you through the rough times. Exercise, go to the beach, read a book, or play with your pet; find those things that will help you to recharge your batteries and make them a part of your usual routine. You have entered a world of heroes and villains, happy and sad stories, long journeys and adventures, and many daunting challenges. I urge you to face these challenges head on, always remembering who you are and why you decided to become a doctor in the first place. One of my favorite Disney characters is Winnie the Pooh, so I'd like to leave you with some wise words that Christopher Robin once said to Pooh Bear: "Promise me that you'll always remember that you are braver than you believe, stronger than you seem, and smarter than you think." Thank you so much for allowing me to be a part of this special evening and I truly look forward to working with each and every one of you over the next four years. Welcome to Magical World of Medicine!

Dr. Omori was selected by the student body of the John A. Burns School of Medicine as the recipient of the 2015 Leonard Tow Humanism Award, the Arnold P. Gold Foundation. Dr. Omori delivered this speech at the White Coat Ceremony on July 17, 2015. (The Leonard Tow Humanism in Medicine Awards are presented to a graduating student and faculty member [MD or DO] at over 100 of the nation's medical schools. This award is given to those who best demonstrate the Foundation's ideals of outstanding compassion in the delivery of care; respect for patients, their families, and healthcare colleagues; and clinical excellence.)

Author's Affiliation:
Dr. Omori is Associate Professor, Department of Family Medicine and Community Health and the Associate Director of the Office of Medical Education, John A. Burns School of Medicine, University of Hawai'i.

Initiating Bicycle Sharing in Hawai‘i: Lessons Learned from a Small Pilot Bike Share Program

Lehua B. Choy DrPH; Heidi Hansen Smith BA; Justine Espiritu MA; Earl Higa MA; Thomas Lee MPH; and Jay Maddock PhD

Insights in Public Health is a monthly solicited column from the public health community and is coordinated by HJMPH Contributing Editors Tetine L. Sentell PhD from the Office of Public Health Studies at the University of Hawai'i at Manoa and Donald Hayes MD, MPH from the Hawai'i Department of Health in collaboration with HJMPH Associate Editors Tonya Lowery St. John MPH and Lance K. Ching PhD, MPH from the Hawai'i Department of Health.

Abstract

In 2011, a small pilot bike share program was established in the town core of Kailua, Hawai'i, with funding from the Hawai'i State Department of Health. The Kailua system consisted of two stations with 12 bicycles, and the goal was to secure additional funding to expand the station network in the future. Community feedback consistently indicated support for the bike share program. However, system metrics showed low levels of usage, averaging 41.5 rides per month (2011-2014). From observational data, users were primarily tourists. With minimal local staff, the bike share program had limited resources for promotion and education, which may have hindered potential use by local residents. Management of station operations and bike maintenance were additional, ongoing barriers to success. Despite the challenges, the pilot bike share program was valuable in several ways. It introduced the bike share concept to Hawai'i, thereby helping to build awareness and connect an initial network of stakeholders. Furthermore, the pilot bike share program informed the development of a larger bike share program for urban Honolulu. As limited information exists in the literature about the experiences of smaller bike share programs and their unique considerations, this article shares lessons learned for other communities interested in starting similar bike share programs.

Keywords

bicycling, bike share program, active transportation, suburban community

Bike share programs are proliferating across the United States and constitute the most rapidly growing form of public transportation.[1] Bike share systems provide a network of bicycles for short-term rental so that users can make relatively short trips to work, shopping, and other destinations.[2] Larger bike share programs, such as Citi Bike in New York City, are typically located in urban areas with a sufficient population base to make the systems economically feasible. However, the bike share concept has also been implemented in smaller systems that serve towns and universities. Of the 68 US bike share systems that were on the ground in 2014, there were 26 systems (38.2%) with five or fewer stations and 21 systems (30.9%) with 50 bicycles or fewer.[3] Compared to the literature available about large bike share systems, not as much is known about the experiences of smaller bike share programs and their unique considerations. The purpose of this article is to share the experiences and lessons that have been learned from a small pilot bike share program in the town of Kailua, Hawai‘i.

Background

The bike share concept was first introduced in the state of Hawai‘i when the Department of Health, Healthy Hawai‘i Initiative (HHI) provided funding to establish a pilot program in 2009. Through a competitive Request for Proposal process, Hawai‘i B-cycle was awarded $100,000 to install and maintain two stations with a total of 12 bicycles, conduct community outreach and educational activities, and secure sponsorship that would add two to four new stations to the system. At the time, Hawai‘i B-cycle consisted of B-cycle, LLC, a national provider of bike share systems located in Wisconsin, and Momentum MultiSport, the designated local operator based out of a Honolulu bike shop business.

Kailua Town was selected for the pilot bike share system based on the results of a community needs assessment and favorable geographic characteristics (eg, relatively flat topography and short commute distances between destinations such as stores and parks). Kailua had an existing network of bicycle lanes, routes, and paths to support bicycling. Moreover, the major landowner in Kailua Town, Kaneohe Ranch Management Limited, was supportive of the pilot project and donated sites on their commercial property for the two bike share stations. Approximately 38,635 people live in Kailua. Compared to the state of Hawai‘i overall, Kailua has a higher proportion of Caucasians (44.0% vs 24.7%) and a higher median household income ($95,190 vs $67,492).[4] Kailua, with its beautiful beaches and small-town charm, is also an attractive destination for tourists.

Launch

The Kailua pilot bike share system was officially launched in April 2011 with the installation of two stations in Kailua's town core. To celebrate the new pilot program, elected officials, partner organizations, and local media were invited to a May 2011 event that allowed attendees to ride the bike share bicycles. In addition to earned media coverage, Hawai‘i B-cycle also gave presentations to community groups like the Kailua Neighborhood Board to build awareness of and support for the Kailua pilot bike share program. However, Hawai‘i B-cycle was not able to pay for any advertising activities.

System Usage

Metrics generated from the Hawai'i B-cycle system revealed that virtually all of the users purchased short-term 24-hour passes (rather than monthly or yearly passes). From observational data, the majority of riders appeared to be Japanese tourists. Table 1 presents the monthly average number of rides by year for Hawai'i B-cycle. Ridership started off at a relatively high level, declining in the second year on-the-ground when the system was without a coordinator to oversee operations. Ridership began to increase again in 2013, perhaps reflecting the strong tourism market during this period. However, ridership began to drop again at the end of 2013 after the loss of the part-time mechanic who helped to maintain the bicycles and the relocation of one of the stations. Ridership remained low throughout 2014.

The overall average number of rides taken per month was 41.5 for Hawai'i B-cycle. These usage numbers are significantly lower than that of a comparably sized system in Spartanburg, SC. With a total of two stations and 14 bicycles, the Spartanburg system averaged nine rides per day, which would equate to 270 rides per month.[2] Although the number of rides is low, the average ride duration was 160 minutes for Hawai'i B-cycle. With the additional fees incurred for longer rides, a 160-minute ride would cost a tourist $17.50 ($5 membership fee for the 24-hour pass, plus $12.50 in additional usage charges). In contrast, a local user could pay $50 for an annual membership that would cover an unlimited number of short rides (ie, less than 30 minutes) throughout the year.

Table 1. 2011-2014 Ridership metrics for Hawai'i B-cycle: Kailua pilot bike share project.

Year	Average number of rides per month (SD)	Total number of rides per year
2011*	67.7 (32.3)	609
2012	41.8 (16.5)	502
2013	52.5 (25.7)	630
2014	10.6 (5.3)	127
Overall	41.5 (29.4)	1,868

*Partial year (April – December)

Lesson Learned #1: The importance of a clearly-defined organizational structure

The first lesson learned from the experience of Hawai'i B-cycle is the need for a well-defined organizational structure. Many of the challenges experienced by Hawai'i B-cycle could have been ameliorated by the existence of a distinct organization. In the case of Hawai'i B-cycle, the State Department of Health, HHI, provided funding to establish Hawai'i B-cycle. Yet, Hawai'i B-cycle had a nebulous organizational form in which B-cycle, LLC, was the primary organization receiving the contract from HHI. In turn, B-cycle, LLC, subcontracted the bike shop, Momentum Multisport, to be the local lead in ensuring operations, outreach and promotion. When Momentum Multisport closed business and the coordinator resigned from Hawai'i B-cycle in November 2011, Hawai'i B-cycle floundered. The Wisconsin-based B-cycle LLC had no local point-of-contact in Hawai'i who could take on responsibility of system operations. Therefore, it relied on the HHI contract manager, who had no specific job-related responsibilities towards bike share system operations, to help with issues such as resetting a station when it went offline. The system existed for almost a year without a dedicated staff person to oversee maintenance and build awareness of Hawai'i B-Cycle, a critical period in which focusing on promotional activities and community outreach may have helped to ensure the success of the pilot program.

The HHI contract with B-cycle, LLC, officially ended in December 2012. Some of the contract deliverables regarding community education, partnership development with local businesses and community groups, and awareness building and promotion had been unfulfilled. Nevertheless, both HHI and B-cycle, LLC, were committed to the success of the pilot project and wanted to sustain the system. However, it was unclear who "owned" the bike share system and thus had responsibility for managing operations. Multiple conversations between the two parties were required to work out the details for continuing the pilot project. B-cycle, LLC, continued to provide liability insurance coverage and operate the system software and website. Using revenue generated from usage fees, a part-time bike mechanic was hired by B-cycle, LLC.

Recognizing the need to fill the vacant coordinator position, HHI used funding from a Cooperative Agreement with the Centers for Disease Control and Prevention to hire a part-time coordinator in April 2013. One of the newly-hired coordinator's primary duties was to manage the relocation of one bike station to a new site nearby because the landowner was redeveloping the original site. Again, discussions were required to determine who would bear the costs of relocation. The second major duty was securing funding to expand the station network. Activities geared towards expansion included approaching local businesses about willingness to sponsor additional stations and submitting one grant application to a foundation. Because Hawai'i B-cycle did not obtain status as a stand-alone non-profit, the coordinator needed to secure a non-profit fiscal sponsor in order to apply for the foundation grant. Unfortunately, even after securing a fiscal sponsor, based on the fact that B-cycle, LLC, was the primary operator of Hawai'i B-cycle, the foundation considered Hawai'i B-cycle a for-profit entity and did not fund the application. Thus, the unclear organizational structure was a major barrier to both system operations and expansion.

Lesson Learned #2: The challenge of bike maintenance for a small system

Properly maintaining the bicycles in bike share systems has been identified as an important factor affecting system usage.[2] Hawai'i B-cycle learned that maintenance can be extra challenging for a small bike share system—especially one that is located on a geographically-isolated island—for three main reasons:

Economies of scale. It is not as cost-effective or efficient to maintain the bicycles on a small system compared to a larger system. Hawai'i B-cycle had trouble finding a bike mechanic who was willing to service the bicycles on a part-time basis—typically 1-3 hours per week. Given the lack of a warehouse or repair facility for Hawai'i B-cycle, the part-time mechanic also had to provide the space to house tools and inoperable bicycles, as well as a vehicle capable of transporting bicycles between bike stations and the place where repairs were made. Although the coordinator reached out to local bike shops, the limited funding made it unfeasible for the bike shops to take on the responsibility for maintenance. An innovative solution to bike maintenance was reached in January 2014 through a partnership with the Kalihi Valley Instructional Bike Exchange (KVIBE), a program of Kokua Kalihi Valley Health Center. KVIBE youth participants volunteered to help service the bicycles and were able to make most of the needed repairs to bike share bicycles throughout 2014. Through this service project, the youth gained vocational skills in repairing complicated bike share bicycles.

Length of time to make repairs. When the bike share system malfunctioned, such as the docking station going offline because of a faulty wireless card, it took a significant amount of time to fix the problem because parts needed to be shipped between Hawai'i and Wisconsin (ie, the headquarters of B-cycle, LLC) for repair or replacement. During that time, the bike share system was not usable. An additional challenge was the time difference between Hawai'i and the continental US, which required extra effort to coordinate communication about repairs and system operations.

Rust. Both bike share stations were located within a mile of the ocean. The salt in the air and high levels of humidity caused the bike share docking stations and bicycles to rust more quickly than anticipated. Within a year of being installed, B-cycle, LLC, replaced the docking stations with a more rust-resistant model. Maintenance repairs included changing out rusty baskets located in the front of the bicycles and replacing rusty bolts. For the case of Hawai'i, B-cycle, LLC, learned that establishing a proactive maintenance program for the bike share equipment was critical.

The most common maintenance issues were keeping tires inflated, replacing tubes, and replacing sticky handlebar grips. The casings on some of the wires also began to split, and though it did not make the bicycles inoperable, it contributed to the appearance of a lack of maintenance. Importantly, by the 18th month on the ground, the locks for all of the bicycles needed to be replaced; the cables for the locks on all of the bicycles were cut through and/or keys were missing or inoperable because of rust. The lack of functional locks prevents users from being able to secure the bicycles if they stop at places without a docking station (eg, stores, beaches, parks, etc.). Hawai'i B-cycle experienced other minor issues with vandalism, such as graffiti on the docking stations.

Lesson Learned #3: Making the best of a limited capacity for promotion and education

Promotion, outreach, and education are important to increase bike share system ridership and build community support for the bike share program. Since the coordinator for the Kailua pilot program was only funded part-time, there was limited capacity to conduct promotional and educational activities. Most of the coordinator's time was devoted to managing bike share operations. Nevertheless, the coordinator carried out several efforts:

- Approached local Kailua businesses to share information about the bike share system and assess interest in collaboration and sponsoring additional stations;
- Participated in multiple community events to highlight the pilot bike share program;
- Through a partnership with the Hawai'i Bicycling League, offered a Cycle 101 class to adults interested in becoming more comfortable riding a bike; and
- Maintained the Hawai'i B-cycle Facebook page.

Partnerships with other community organizations were essential to carrying out the majority of the promotional and educational activities. The pilot bike share project was valuable to partners who care about increasing bicycling and active transportation because they could share an example of something that was actually on-the-ground. Participating in community outreach and promotional events helped to increase awareness of the pilot bike share program, but did not directly result in increased usage.

To gauge community buy-in for the Kailua pilot bike share program, community residents were surveyed at the 2011 (pre-launch), 2012, and 2014 "I Love Kailua" town celebrations. While this was a convenience sample, the community residents who did complete surveys were largely supportive of having a bike share system in their community. Most community members were at least somewhat familiar with the concept of bike sharing and understood its environmental benefits and potential to reduce traffic congestion in the town center. However, the 2012 and 2014 survey results indicated that community members were not actually using the bike share system. To promote the use of Hawai'i B-cycle by community members, it may have been useful to focus efforts on increasing the visibility of bike share and providing incentives to get people on the bicycles. One recent study found that people wanted to see other people riding the bike share system bicycles before they would consider using it themselves.[5]

Next Steps

As a pilot program, a primary goal of Hawai'i B-cycle was "proof of concept." Although many challenges were faced in trying to establish and sustain the pilot program, the viability of bike sharing in Hawai'i was demonstrated. Lessons learned from the Kailua pilot bike share program were shared with

stakeholders throughout the development of Bikeshare Hawai'i, a non-profit organization established in 2014 with support from Honolulu City & County, as well as, state, federal, and private-sector agencies. Bikeshare Hawai'i leaders are seeking a mix of public and private funding to launch a large system with 200 stations and 2,000 bicycles throughout urban Honolulu in 2016.[6] The Kailua pilot program coordinator's insights were shared with Bikeshare Hawai'i leaders in meetings and during program planning activities. For example, the Kailua pilot program coordinator determined that ensuring that the bike share system is usable and attractive to Japanese tourists would entail: (1) Japanese-language capability on bike share station kiosks; (2) accommodation of the JCB credit card, which is a popular Japan-based credit card; and (3) promotion in Japanese-visitor advertising publications and social media.

At the end of 2014, B-cycle, LLC, decided to remove the bike share system from Kailua. The bicycles and docking stations were donated to Better Tomorrows at the Towers of Kuhio Park, a non-profit organization serving a mixed-income housing project in urban Honolulu. Better Tomorrows took on the bike share equipment to increase the transportation options of residents—given that many do not own cars. The staff of Better Tomorrows envisioned a system in which residents would be able to check out a bicycle for short-term use, whether it be to get to a grocery store or a doctor's appointment. Locks were provided by B-cycle, LLC, so that residents would have a way of securing the bicycles, and helmets and safety vests were provided by the Queen's Medical Center Injury Prevention Branch. However, before residents are able to start using the bicycles, Better Tomorrows is pursuing several actions: (1) securing maintenance and repair support to bring all bicycles back into operational condition; and (2) providing bicycle education classes to interested residents so that they learn how to ride a bicycle safely and with confidence. Until all bicycles are back in operational condition, the maintenance staff at the Towers of Kuhio Park currently use several of the bicycles to get around the 18-acre housing site and carry out their work. Most of the maintenance staff are also residents at the Towers of Kuhio Park, and they are helping to promote the visibility of the bike share bicycles until they become available for wider use by residents.

Conclusion

As plans to bring bike sharing to urban Honolulu move forward, the Kailua pilot bike share project provided several valuable lessons for stakeholders to consider, especially in identifying practical challenges (eg, organizational structure and maintenance), the critical role of initial and ongoing program promotion and outreach, and considerations for relevant user groups such as Japanese-speaking tourists. Despite the low usage of the system, as a pilot program, Hawai'i B-cycle introduced the concept of bike sharing to Hawai'i and served as an on-the-ground example of how bike sharing has the potential to work in Hawai'i.

Acknowledgements

An earlier version of this article was presented at the *51st International Making Cities Livable Conference,* Portland, OR, 2014. Hawai'i B-cycle received funding from Tobacco Settlement Special Funds through a contract with the Hawai'i State Department of Health, Healthy Hawai'i Initiative. Additional funding from the Centers for Disease Control and Prevention was awarded under Cooperative Agreement No. 5U58DP001411-04. The authors would like to thank the following individuals and organizations for their support of the Kailua pilot bike share project: Lee Jones with B-cycle, LLC; Kimo Steinwascher with Alexander & Baldwin (formerly with Kaneohe Ranch); Marcos Bendana, Jared Christenot, and the youth volunteers with the Kalihi Valley Instructional Bike Exchange, Kokua Kalihi Valley; Anni Peterson with Better Tomorrows Hawai'i; the team from the national office of Better Tomorrows; and Brandon Hegland with Interstate Realty Management.

Authors' Affiliations:
- University of Hawai'i at Manoa, Department of Public Health Sciences, Honolulu, HI (LBC, JE, EH, TL)
- Hawai'i State Department of Health, Healthy Hawai'i Initiative, Honolulu, HI (HHS)
- Texas A&M Health Science Center, School of Public Health, College Station, TX (JM)

References

1. Nelson\Nygaard Consulting Associates. Honolulu Bikeshare Organizational Study. Report prepared for the City & County of Honolulu, Department of Planning and Permitting; 2014.
2. Kahn R. Bicycle sharing in the U.S.A.—state of the art. *ITE Journal.* 2012; 82(9): 32-36.
3. Pedestrian and Bicycle Information Center. List of Bike Share Programs in the U.S. [Data file]. http://www.pedbikeinfo.org/pdf/Programs_Promote_BikeSharePrograms_041213.pdf.Accessed April 21, 2014.
4. U.S. Census Bureau. State and county quick facts: Kailua CDP (Honolulu), Hawaii. http://quickfacts.census.gov/qfd/states/15/1523150.html. Accessed April 11, 2014.
5. Fishman E, Washington S, Haworth N. Barriers and facilitators to public bicycle scheme use: A qualitative approach. *Transp Res Part F Traffic Psychol Behav.* 2012;15:686-698.
6. Bikeshare Hawai'i. About Bikeshare Hawai'i. http://www.bikesharehawaii.org/about/. Accessed September 21, 2015.

HAWAI'I JOURNAL OF MEDICINE & PUBLIC HEALTH

The Hawai'i Journal of Medicine & Public Health invites students and professionals at public health, medical, nursing, pharmacy, and dental schools or programs to enter in its **1st Annual Writing Contest**.

Submissions must be original works related to the practice of medicine or public health, with a focus on the Hawaiian Islands or Pacific Rim region.

Eligibility:

- Undergraduates, masters- and doctoral-level students, post-doctoral fellows, and residents.
- Applicants must have an advisor who can attest to the individual's contributions and provide final approval of the submitted work.

Enter to win $500

ORIGINAL WORKS

Up to three cash prizes will be awarded.

- Undergraduate Prize - $500
- Graduate Student Prize - $500
- Post-Graduate Prize - $500

Winners will have their photographs featured along with their works in a future issue of HJM&PH. Selected manuscripts will be announced **January 15, 2016**.

For more info scan:

www.hjmph.org/contest

writing contest

Deadline 12/7/2015

Contact the Journal at:

info@hjmph.org

THE WEATHERVANE

RUSSELL T. STODD MD; CONTRIBUTING EDITOR

FOR LONG FLIGHTS OLDER ADULTS NEED AN AISLE SEAT.

When blood doesn't flow properly, blood clots can form. Travelers on long flights crammed into seats that barely allow motion, women taking birth control drugs and especially hospital patients are all at risk for clots. Thromboembolic clots form in deep veins of extremities, break loose and migrate to the lungs where an obstructive clot will impair breathing and can be fatal. Knowing that almost half of clots hit patients when they are in the hospital or soon after discharge, now many hospitals are intensifying their clot prevention. They may incur financial penalties with reduced payments when patients develop clots while under their care. Centers for Disease Control and Prevention (CDC) state that 900,000 cases of deep vein thrombosis occur annually in the United States and about one third will become pulmonary emboli. More than half of patients who had preventable clots received sub-optimal care. Efforts by Johns Hopkins Hospital over the last decade found it was difficult to improve clot prevention. Nurses reported they believed they could judge whether patients needed anti-coagulants. They also told patients the medication was optional leading some to refuse the drugs. Bottom line: keep the body in motion, avoid prolonged bed rest, and minimize any hospital stay.

I FEEL OKAY, BUT MY EYE IS REALLY WEEPY AND RED.

Conjunctivitis, "pink eye," is a highly communicable ocular infection that spreads quickly in school children and other close contacts. Too often patients are treated with topical antibiotics that do not touch the adenovirus, the most common form of the malady. Foresight Biotherapeutics Inc. is in stage three testing with a medication (FST-100) that will manage both bacterial and viral conjunctivitis. Shire PLC has agreed to buy the privately held eye-drop company to the tune of $300 million. The topical drug is a mixture of 0.6% povidone iodine and 0.1% dexamethasone. If it performs as claimed it will have an immediate and beneficial impact. One obvious downside is the rare occurrence of ocular herpes that would be made worse with a topical steroid drug.

YOU GOTTA HAVE HEART...

Jason Bitsko was an apparently healthy football player for Kent State University who suddenly fell dead following a practice session. An autopsy determined that he had a heart condition called HCM, hypertrophic cardiac myopathy, an abnormality whose first symptom is often death. HCM, although rare, is the commonest cause of sudden death in young American athletes. The pathology is easily detected with an EKG (electrocardiogram) or echocardiogram, so the issue for the athletic program is whether to require testing prior to athletic participation. The American Heart Association (AHA) argues that routine EKG testing of young athletes has not been proven to save lives. The medical trend widening in the NCAA is team physicians making EKGs a requirement. Legal experts say the AHA position provides a layer of protection for programs that don't demand EKG screening. Still, many schools believe that the worst case would be an athlete falling dead from a hidden problem that could have been detected. An EKG is simple, non-threatening, and easily administered, What's not to like for athletic administrators?

OFFLINE DRUG PROMOTION IS HERE TO STAY.

For years doctors have been using medications for conditions not approved by the Food and Drug Administration (FDA). When a drug is marketed for a purpose not approved by the FDA the company is in violation of the law, according to regulators. Now a federal court in New York ruled against the FDA stating a drug can be marketed offline as long as the claims are truthful. The decision concerns Amarin Pharma Inc. and its fish-oil-derived drug Vascepa. Now Amarin can give doctors and others truthful accounts of medical studies of the drug for reducing moderately high blood fats. Moreover, the decision underscores the need for the FDA to examine and rethink how it regulates medical information. This decision follows a similar one decided in January 2013 when the government sought to prosecute a drug company salesman. He was convicted for off label marketing, but the appellate court said the FDA's regulation was a violation of free speech.

PLEASE PLAY GLEN MILLER'S MOONLIGHT SONATA.

A study of 7,000 surgical patients reported in Lancet found that playing music in the operating room was beneficial to the patient and the surgical staff. When asked if they wanted music during the procedure, nine out of ten gave a positive reply. Patients were more relaxed preoperatively than they were with medication, but the music needs to be calm and soothing, usually classical. The surgeon or anesthesiologist usually makes the selection. This is especially useful today since more procedures are performed with the patient awake or only mildly sedated, as with hernia repair, D and C, cataract surgery or endoscopy.

HEY. DON'T GO NEAR THE WATER.

Researchers at the Centers for Disease Control and Prevention worked with the Environmental Protection Agency to analyze data from 54,250 people at nine US beaches, oceans, lakes, or rivers, including one from Puerto Rico. All swim areas met local and federal guidelines, but seven were near sewage-disposal points (Yuck: Waikiki, Lahaina). Two-thirds of beachgoers were under age 50. Three-quarters went into the water, 65% immersed their head, 41% got water in their mouth and 18.5% swallowed the water. Goggles were used by 8.7% and ear plugs by 1.2%. Phone interviews taken for health problems 10 to 12 days after the water visit found GI illness the most common complaint, followed by respiratory, eye and ear, urinary tract, and rash. Of those who fell ill, 15.5% saw a doctor and 3.1% went to the emergency department. More than half got OTC drugs while 17% required a prescription. Caveat: these are just the ones who reported.

STICK THIS IN YOUR CURRICULUM VITAE. PERHAPS THIS RENAISSANCE LINEMAN CAN DERIVE A FORMULA TO PROTECT NFL PLAYERS' BRAINS.

In March John Urshel, offensive lineman for the Baltimore Ravens, co-authored the latest of his academic efforts, "A cascadic multigrid algorithm for computing the Fiedler vector of graph laplacians" for the Journal of Computational Mathematics. One might ask, if Urshel can understand, modify, or advance the tangled formulae of numbers, signs, and Greek letters in this field, why is he playing football? Answer: "There's a rush you get when you run out on the field and physically dominate the player across from you. And I love hitting people."

ADDENDA

- "Everyone who is incapable of learning has taken to teaching." Oscar Wilde
- The United States is the only western country that restricts marriage between cousins.
- Great moments in science: Einstein discovers that time is actually money.
- You know there is a problem with the education system when you realize that only one of the three Rs actually begins with R.
- Nietzsche is pietsche, but Sartre is smarter.
- When a book and a head collide and there is a hollow sound, is it always from the book?
- My wife and I don't have mutual orgasms. We have State Farm.

ALOHA AND KEEP THE FAITH **rts**

(Editorial comment is strictly that of the writer.)

MIEC Belongs to Our Policyholders!

Gary Okamoto, MD
Board of Governors

Keeping true to our mission

MIEC has never lost sight of its original mission, always putting policyholders (doctors like you) first. For almost 35 years, MIEC has been steadfast in our protection of Hawaii physicians with conscientious Underwriting, excellent Claims management and hands-on Loss Prevention services; we've partnered with policyholders to keep premiums low.

Added value:

- No profit motive and low overhead
- Local Honolulu claims office
- Dividends for an average savings of 28% on 2015 premiums for Hawaii physicians*

For more information or to apply:

- www.miec.com
- Call 800.227.4527
- Email questions to underwriting@miec.com

* On premiums at $1/3 million limits. Future dividends cannot be guaranteed.

MIEC 6250 Claremont Avenue, Oakland, California 94618 • 800-227-4527 • www.miec.com

UCERA_ad_12.30.14

MIEC

Owned by the policyholders we protect.